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*The Home Medical
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The Home Medical Library

By

KENELM WINSLOW, B.A.S., M.D.

Formerly Assistant Professor Comparative Therapeutics, Harvard University; Late Surgeon to the Newton Hospital; Fellow of the Massachusetts Medical Society, etc.

With the Coöperation of Many Medical
Advising Editors and Special Contributors

IN SIX VOLUMES

*First Aid :: Family Medicines :: Nose, Throat, Lungs,
Eye, and Ear :: Stomach and Bowels :: Tumors and
Skin Diseases :: Rheumatism :: Germ Diseases
Nervous Diseases :: Insanity :: Sexual Hygiene
Woman and Child :: Heart, Blood, and Digestion :: Personal Hygiene :: Indoor Exercise
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Volume I

FIRST AID IN EMERGENCIES

By KENELM WINSLOW, B.A.S., M.D. (Harv.)

Formerly Assistant Professor Comparative Therapeutics, Harvard University; Late Surgeon to the Newton Hospital; Fellow of the Massachusetts Medical Society, etc.

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GERM DISEASES

By KENELM WINSLOW, B.A.S., M.D. (Harv.)

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Preface

MEDICINE, as the art of preserving and restoring health, is the rightful office of the great army of earnest and qualified American physicians. But their utmost sincerity and science are hampered by trying restrictions with three great classes of people: those on whom the family physician cannot call *every day*; those on whom he cannot call *in time*; and those on whom he cannot call *at all*.

To lessen these restrictions, thus assisting and extending the healer's work, is the aim of the pages that follow.

Consider first the average American household, where the family physician cannot call *every day*. Not a day finds this household without the need of information in medicine or hygiene or sanitation. More efforts of the profession are thwarted by ignorance than by epidemic. Not to supplant the doctor, but to supplement him, carefully prepared information should be at hand on the hygiene of health—sanitation, diet, exercise, clothing, baths, etc.; on the hygiene of disease—nursing and sick-room conduct, control of the nervous and insane, emergency resources, domestic remedies; above all, on the prevention of disease, emphasizing the folly of self-treatment; pointing out the danger of delay in seeking skilled medical advice with

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such troubles as cancer, where early recognition may bring permanent cure; showing the benefit of simple sanitary precautions, such as the experiment-stations method of exterminating the malaria-breeding mosquito. The volumes treating of these subjects cannot be made too clear, nontechnical, fundamental, or too well guarded by the supervision of medical men known favorably to the profession.

Again, the physician cannot come *on time* to save life, limb, or looks to the victim of many a serious accident. And yet some bystander could usually understand and apply plain rules for inducing respiration, applying a splint, giving an emetic, soothing a burn or the like, so as to safeguard the sufferer till the doctor's arrival—if only these plain rules were in such compact form that no office, store, or home in the land need be without them.

Finally, the doctor *cannot come at all* to hundreds of thousands of sailors, automobilists, and other travelers, to ranchers, miners, and country dwellers of many sorts. This third class has had, hitherto, little choice between some "Practice of Medicine," too technical to be helpful, on the one hand, and on the other, the dubious literature of unsanctioned "systems"; or the startling "cure-all" assertions emanating from many proprietors of remedies; or "Complete Family Physicians," which offer prescriptions as absurd for the layman as would be dynamite in the hands of a child, with superfluous and loathsome pictures ap-

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pealing only to morbid curiosity, and with a general inaccuracy utterly out of touch with twentieth-century knowledge. What such people need, much more than the dwellers in settled communities, is to learn the views of modern medicine upon the treatment of the ever-present common ailments—the use of standard remedies, cautions against the abuse of narcotics, lessons of discrimination against harmful, useless, or expensive “patent medicines,” and proper rules of conduct for diet, nursing, and general treatment.

Authentic health literature existed abundantly before the preparation of these volumes, but it was scattered, expensive, and in most cases not arranged for the widest use. Not within our knowledge has the body of facts, most helpful to the layman on Sanitation and Hygiene, First Aid, and Domestic Healing, been brought together as completely, as clearly, as concisely, with a critical editing board so qualified, and with special contributions so authoritative as this work exhibits.

“Utmost caution” has been a watchword with the editors from the start. Those to whom the doctor *cannot come every day* have been repeatedly warned of the follies of self-treatment, and reminded that to-day it is the patient that is treated—not the disease. Those to whom the doctor *cannot come in time* are likewise warned that the “First-aid Rules” of this Library are for temporary treatment only, in all situations where it is possible to get a physician. And the utmost

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conservatism has been striven for by the author and the several revisers in every part of the work that appeals particularly to dwellers in localities so removed that the doctor *cannot come at all*. Especial delicacy was also sought in the treatment of a chapter which, it is hoped, will aid parents to guide their children in sexual matters. The illustrations represent helpful, normal conditions (with the exception of some necessary representations of fracture, etc.) with instructive captions aimed to make them less a sensation than a real benefit; and no pictures appear of a sort to stimulate mere morbid curiosity.

The greatest sympathy and appreciation of this work have been shown by the progressive and recognized practitioners who have seen early copies. They recognize it as a timely attempt to create and compile health literature in a form most complete within its limits of space, and in a manner most helpful and sane. The eager curiosity regarding *themselves* that has been sweeping over the American people has been diverted into frivolous and harmful channels by much reckless talk and writing. A prominent newspaper, in its Sunday editions, recently took up the assertion, in a series of articles, that appendicitis operations resulted from a gigantic criminal conspiracy on the part of surgeons; that a sufficient cure for appendicitis, "as any honest doctor would tell you," is an injection of molasses and water! The endless harm done by such outright untruth is swelled by a joining stream of slapdash mis-

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information and vicious sensation, constantly running through the press.

Education is sorely needed from authority. People *will* read about their bodies. They have a right to information from the highest accredited source. And to apply such knowledge Dr. Winslow has labored for many years during his practicing experience, condensing and setting into clear order the most vitally important facts of domestic disease and treatment; an eminently qualified staff of practicing specialists has coöperated, with criticism and supervision of incalculable value to the reader; and the accepted classics in their field follow: Dr. Weir Mitchell's elegant and inspiring essays on Nerves, Outdoor Life, etc.; Sir Henry Thompson's "precious documents of personal experience" on Diet and Conduct for Long Life; Dr. Dudley A. Sargent's scientific and long-prepared system of exercises without apparatus; Gerhard's clear principles of pure water supply; Dr. Darlington's notes and editing from the unequalled opportunity of a New York City Health Commissioner—and many other "special contributions."

It is the widely accepted modern medicine, and no school or "system," that is reflected here. While medicine, as a science, is far from being perfect, partly because of faulty traditions and misinterpreted experience, yet the aim of the modern school is to base practice on *facts*. For example, for many years physicians were aware that quinine cured malaria, in some unex-

Preface

plainable way. Now they not only know that malaria is caused by an animal parasite living and breeding in the blood and that quinine destroys the foe, but they know about the parasite's habits and mode of development and when it most readily succumbs to the drug. Thus a great discovery taught them to give quinine understandingly, at the right time, and in the right doses.

An educated physician has at his command all knowledge, past and present, pertaining to medicine. He is free to employ any means to better his patient. Now it is impossible to cure, or even better, all who suffer from certain disease by any one method, and a follower of a special "system" thus ignores many agencies which might prove efficient in his case. While there is a germ of good and truth in the various "systems" of medical practice, their representatives possess no knowledge unknown to science or to the medical profession at large. Many persons are always attracted by "something new." But newness in a medical sect is too often newness in name only. These systems rise and fall, but scientific, legitimate medicine goes ever onward with an eye single to the discovery of new facts.

That these volumes will result in an impetus to saner, quieter, steadier living, and will prove a helpful friend to many a physician and many a layman, is the earnest wish of

THE PUBLISHERS.

Part I

FIRST AID IN EMERGENCIES

BY

KENELM WINSLOW

AND

ALBERT WARREN FERRIS

Introductory Note

WITH the exception of the opening chapter, which contains the valuable Life-saving Service Rules *verbatim*, the Editors have adopted the plan of beginning each article in Part I of this volume with a few simple, practical instructions, telling the reader exactly what to do in case of an accident. For the purpose of distinguishing them from the ordinary text, and making them easy of reference, these "*First-aid Rules*" are *printed in light-faced type*.

CHAPTER I

Restoring the Apparently Drowned

As Practiced in the United States Life-Saving Service

NOTE.—These directions differ from those given in the last revision of the Regulations by the addition of means for securing deeper inspiration. The method heretofore published, known as the Howard, or direct method, has been productive of excellent results in the practice of the service, and is retained here. It is, however, here arranged for practice in combination with the Sylvester method, the latter producing deeper inspiration than any other known method, while the former effects the most complete expiration. The combination, therefore, tends to produce the most rapid oxygenation of the blood—the real object to be gained. The combination is prepared primarily for the use of life-saving crews where assistants are at hand. A modification of Rule III, however, is published as a guide in cases where no assistants are at hand and one person is compelled to act alone. In preparing these directions the able and exhaustive report of Messrs. J. Collins Warren, M.D., and George B. Shattuck, M.D., committee of the Humane Society of Massachusetts, embraced in the annual report of the society for 1895-96, has been availed of, placing the department under many obligations to these gentlemen for their valuable suggestions.

IF SEVERAL ASSISTANTS ARE AT HAND

RULE I. *Arouse the Patient.*—Do not move the patient unless in danger of freezing; instantly expose the face to the air, toward the wind if there be any; wipe dry the mouth and nostrils; rip the clothing so as to expose the chest and waist; give two or three quick, smarting slaps on the chest with the open hand.

Restoring the Drowned

If the patient does not revive, proceed immediately as follows :

RULE II. *To Expel Water from the Stomach and Chest* (see Fig. 1).—Separate the jaws and keep them apart by placing between the teeth a cork or small

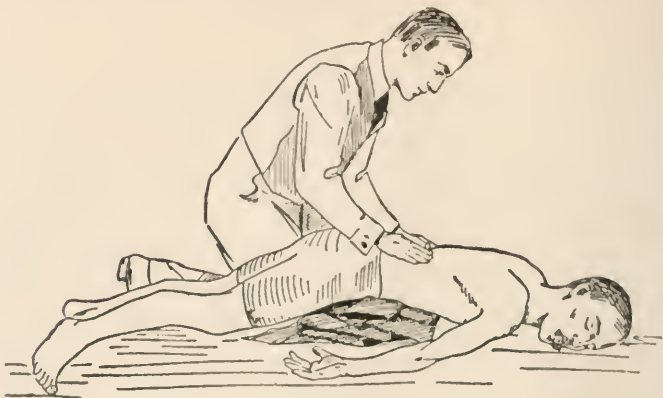


FIG. 1.

TO EXPEL WATER FROM STOMACH AND CHEST.

Patient lying face downward; roll of clothes beneath stomach; jaws separated by piece of wood or cork; note rescuer pressing on back to force out water.

bit of wood, turn the patient on his face, a large bundle of tightly rolled clothing being placed beneath the stomach; press heavily on the back over it for half a minute, or as long as fluids flow freely from the mouth.

RULE III. *To Produce Breathing* (see Figs. 2 and 3).—Clear the mouth and throat of mucus by

introducing into the throat the corner of a handkerchief wrapped closely around the forefinger; turn the patient on the back, the roll of clothing being so placed as to raise the pit of the stomach above the level of the rest of the body. Let an assistant, with a handkerchief or piece of dry cloth, draw the tip of the tongue out of one corner of the mouth (which prevents the tongue from falling back and choking the entrance to the windpipe), and keep it projecting a little beyond the lips. Let another assistant grasp the arms, just below the elbows, and draw them steadily upward by the sides of the patient's head to the ground, the hands nearly meeting (which enlarges the capacity of the chest and induces inspiration). (Fig. 2.) While this is being done let a third assistant take position astride the patient's hips with his elbows resting upon his own knees, his hands extended ready for action. Next, let the assistant standing at the head turn down the patient's arms to the sides of the body, the assistant holding the tongue changing hands if necessary¹ to let the arms pass. Just before the patient's hands reach the ground the man astride the body will grasp the body with his hands, the balls of the thumb resting on either side of the pit of the stomach, the fingers falling into the grooves between the short ribs. Now, using his knees as a pivot, he will, at the moment the patient's hands touch the ground, throw (not too sud-

¹ Changing hands will be found unnecessary after some practice; the tongue, however, must not be released.



FIG. 2.

TO PRODUCE BREATHING.

First Position : Patient lying face upward ; roll of clothes under back ; tongue pulled out of mouth with handkerchief ; note rescuer drawing arms upward to sides of head to start act of breathing in.



FIG. 3.

TO PRODUCE BREATHING.

Second Position : Forcing patient to breathe out ; note rescuer with thumbs on pit of stomach, pressing against front of chest over lower ribs ; also, assistant drawing down arms to body.

Restoring the Drowned

denly) all his weight forward on his hands, and at the same time squeeze the waist between them, as if he wished to force something in the chest upward out of the mouth; he will deepen the pressure while he slowly counts one, two, three, four (about five seconds), then suddenly let go with a final push, which will spring him back to his first position.¹ This completes expiration. (Fig. 3.)

At the instant of his letting go, the man at the patient's head will again draw the arms steadily upward to the sides of the patient's head as before (the assistant holding the tongue again changing hands to let the arms pass if necessary), holding them there while he slowly counts one, two, three, four (about five seconds).

Repeat these movements deliberately and perseveringly twelve to fifteen times in every minute—thus imitating the natural motions of breathing.

If natural breathing be not restored after a trial of the bellows movement for the space of about four minutes, then turn the patient a second time on the stomach, as directed in Rule II, rolling the body in the opposite direction from that in which it was first turned, for the purpose of freeing the air passage from any remaining water. Continue the artificial respiration from one to four hours, or until the patient breathes, according to Rule III; and for a while, after

¹ A child or very delicate patient must, of course, be more gently handled.

the appearance of returning life, carefully aid the first short gasps until deepened into full breaths. Continue the drying and rubbing, which should have been unceasingly practiced from the beginning by assistants, taking care not to interfere with the means employed to produce breathing. Thus the limbs of the patient should be rubbed, always in an upward direction toward the body, with firm-grasping pressure and energy, using the bare hands, dry flannels, or handkerchiefs, and continuing the friction under the blankets, or over the dry clothing. The warmth of the body can also be promoted by the application of hot flannels to the stomach and armpits, bottles or bladders of hot water, heated bricks, etc., to the limbs and soles of the feet.

RULE IV. *After Treatment. Externally.* — As soon as breathing is established let the patient be stripped of all wet clothing, wrapped in blankets only, put to bed comfortably warm, but with a free circulation of fresh air, and left to perfect rest. *Internally:* Give whisky or brandy and hot water in doses of a teaspoonful to a tablespoonful, according to the weight of the patient, or other stimulant at hand, every ten or fifteen minutes for the first hour, and as often thereafter as may seem expedient. *Later Manifestations:* After reaction is fully established there is great danger of congestion of the lungs, and if perfect rest is not maintained for at least forty-eight hours, it sometimes occurs that the patient is seized with great diffi-

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culty of breathing, and death is liable to follow unless immediate relief is afforded. In such cases apply a large mustard plaster over the breast. If the patient gasps for breath before the mustard takes effect, assist the breathing by carefully repeating the artificial respiration.

IF ONE PERSON MUST WORK ALONE

MODIFICATION OF RULE III

[To be used after Rules I and II in case no assistance is at hand]

To Produce Respiration.—If no assistance is at hand, and one person must work alone, place the patient on his back with the shoulders slightly raised on a folded article of clothing; draw forward the tongue and keep it projecting just beyond the lips; if the lower jaw be lifted, the teeth may be made to hold the tongue in place; it may be necessary to retain the tongue by passing a handkerchief under the chin and tying it over the head.¹

Grasp the arms just below the elbows and draw them steadily upward by the sides of the patient's head to the ground, the hands nearly meeting. (See Fig. 4.)

Next lower the arms to the side, and press firmly

¹ If there is stuck through the tongue a pin long enough to rest against the teeth and keep the tongue out of the mouth, the desired effect may be obtained.—EDITOR.

FIG. 4.

ONE PERSON WORKING.

First Position: Note arm movement same as in Fig. 2; also, tongue held between teeth by handkerchief tied under chin pressing teeth against wooden plug.

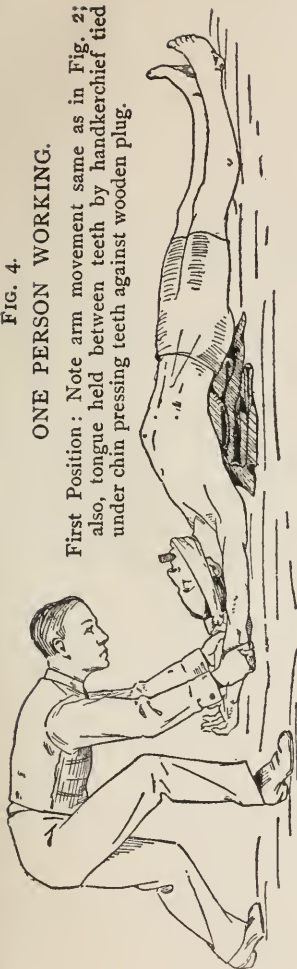


FIG. 5.

ONE PERSON WORKING.

Second Position: Note rescuer lowering arms to patient's sides and pressing downward and inward over lower ribs.



Restoring the Drowned

downward and inward on the sides and front of the chest over the lower ribs, drawing arms toward the patient's head. (See Fig. 5.)

Repeat these movements twelve to fifteen times every minute, etc.

INSTRUCTIONS FOR SAVING DROWNING PERSONS BY SWIMMING TO THEIR RELIEF

1. When you approach a person drowning in the water, assure him, with a loud and firm voice, that he is safe.

2. Before jumping in to save him, divest yourself as far and as quickly as possible of all clothes; tear them off, if necessary; but if there is not time, loose at all events the foot of your drawers, if they are tied, as, if you do not do so, they fill with water and drag you.

3. On swimming to a person in the sea, if he be struggling do not seize him then, but keep off for a few seconds till he gets quiet, for it is sheer madness to take hold of a man when he is struggling in the water, and if you do you run a great risk.

4. Then get close to him and take fast hold of the hair of his head, turn him as quickly as possible on to his back, give him a sudden pull, and this will cause him to float, then throw yourself on your back also and swim for the shore, both hands having hold of his hair, you on your back, and he also on his, and of

course his back to your stomach. In this way you will get sooner and safer ashore than by any other means, and you can easily thus swim with two or three persons; the writer has even, as an experiment, done it with four, and gone with them forty or fifty yards in the sea. One great advantage of this method is that it enables you to keep your head up, and also to hold the person's head up you are trying to save. It is of primary importance that you take fast hold of the hair, and throw both the person and yourself on your backs. After many experiments, it is usually found preferable to all other methods. You can in this manner float nearly as long as you please, or until a boat or other help can be obtained.

5. It is believed there is no such thing as a *death grasp*; at least, it is very unusual to witness it. As soon as a drowning man begins to get feeble and to lose his recollection, he gradually slackens his hold until he quits it altogether. No apprehension need, therefore, be felt on that head when attempting to rescue a drowning person.

6. After a person has sunk to the bottom, if the water be smooth, the exact position where the body lies may be known by the air bubbles, which will occasionally rise to the surface, allowance being, of course, made for the motion of the water, if in a tide way or stream, which will have carried the bubbles out of a perpendicular course in rising to the surface. Oftentimes a body may be regained from the bottom, before

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too late for recovery, by diving for it in the direction indicated by these bubbles.

7. On rescuing a person by diving to the bottom, the hair of the head should be seized by one hand only, and the other used in conjunction with the feet in raising yourself and the drowning person to the surface.

8. If in the sea, it may sometimes be a great error to try to get to land. If there be a strong "outsetting" tide, and you are swimming either by yourself or having hold of a person who cannot swim, then get on your back and float till help comes. Many a man exhausts himself by stemming the billows for the shore on a back-going tide, and sinks in the effort, when, if he had floated, a boat or other aid might have been obtained.

9. These instructions apply alike to all circumstances, whether as regards the roughest sea or smooth water.

CHAPTER II

Heat Stroke and Electric Shock

How Persons are Overcome by Heat—Treatment of Sunstroke—Peculiar Cases—Dangers of Electric Shocks—How Death is Caused—Rules and Precautions.

HEAT EXHAUSTION.

First Aid Rule 1.—Carry patient flat and lay in shade. Loosen clothes at neck and waist.

Rule 2.—Raise head and give him (a) teaspoonful of essence of ginger in glass of hot water, or give him (b) half a cup of hot coffee, clear.

Rule 3.—Put him to bed.

HEAT STROKE.

First Aid Rule 1.—Send for physician.

Rule 2.—Remove quickly to shady place, loosening clothes on the way.

Rule 3.—Strip naked and put on wire mattress (or canvas cot), if obtainable.

Rule 4.—Sprinkle with ice water from watering pot, or dash it out of basin with hand.

Rule 5.—Dip sheet in ice water and tuck it snugly about patient.

Rule 6.—Sprinkle outside of sheet with ice water;

Sunstroke

rub body, through the sheet, with piece of ice. Put piece of ice to nape of neck.

Rule 7.—When temperature falls to 98.5° F. put to bed with ice cap on head.

SUNSTROKE.—There are two very distinct types of sunstroke: (1) Heat exhaustion or heat prostration. (2) Heat stroke.

Heat prostration or exhaustion occurs when persons weakened by overwork, worry, or poor food are exposed to severe heat combined with great physical exertion. It often attacks soldiers on the march, but also those not exposed to the direct rays of the sun, as workers in laundries, in boiler rooms, and in stoke-holes of steamers. The attack begins more often in the afternoon or evening, in the case of those exposed to out-of-door heat. Feelings of weakness, dizziness, and restlessness, accompanied by headache, are among the first symptoms. The face is very pale, the skin is cool and moist, although the trouble often starts with sudden arrest of sweating. There is great prostration, with feeble, rapid pulse, frequent and shallow breathing, and lowered temperature, ranging often from 95° to 96° F. The patient usually retains consciousness, but rarely there is complete insensibility. The pernicious practice of permitting children at seaside resorts to wade about in cold water while their heads are bared to the burning sun is peculiarly adapted to favor heat prostration.

Heat stroke happens more frequently to persons working hard under the direct rays of the sun, especially laborers in large cities who are in the habit of drinking some form of alcohol. It often occurs in unventilated tenements on stifling nights. Dizziness, violent headache, seeing spots before the eyes, nausea, and attempts at vomiting, usher in the attack. Compare it with heat prostration, and note the marked differences. The patient becomes suddenly and completely insensible, and falls to the ground, the face is flushed, the breathing is noisy and difficult, the pulse is strong, and the thermometer placed in the bowel registers 107° , 108° , or 110° F., or rarely higher. The muscles are usually relaxed, but sometimes there are twitchings, or even convulsions. Death often occurs within twenty-four or thirty-six hours, preceded by failing pulse, deep unconsciousness, and rapid breathing, often labored or gasping, alternating with long intermissions. Sometimes delirium and unconsciousness last for days. Diminution of fever and returning consciousness herald recovery, but it is a very fatal disorder, statistics showing a death rate of from thirty to fifty per cent. Even when the patient lives, bad after effects are common. Peculiar sensibility to moderate heat is a frequent complaint. Loss of memory, weakened mental capacity, headache, irritability, fits, other mental disturbances, and impairment of sight and hearing are among the more usual sequels, occurring in those who do not subsequently avoid the direct rays of the sun, as well as an elevated

Sunstroke

temperature, and who indulge in alcoholic stimulants. A high degree of moisture in the air favors sunstrokes, but it is a curious fact that sunstroke is much more frequent in certain localities, and in special years than at other places and times with identical climatic conditions. This has led observers to suggest a germ origin of the disease, but this is extremely doubtful.

Treatment.—Treatment for heat exhaustion is given in the “first-aid” directions. Little need be added to the directions for treatment of heat stroke. In place of the ice cap suggested in Rule 7, ice in cloths, or in a sponge bag may be substituted. The friction of the body, as directed in Rule 6, is absolutely necessary to stimulate the nervous system and circulation, and to prevent the blood from being driven into the internal organs by the cold applied externally. The cold-water treatment is applied until the temperature falls down to within a few degrees of normal—that is, 98.6° F. Then the patient should be put into bed, there to remain, with ice to the head, until fully restored.

It often happens that the fever returns, in which event the whole process of applying cold water must be repeated. The simplest way of reducing the fever consists in laying the patient, entirely nude, on a canvas cot or wire mattress, binding ice to the back of his neck, and having an attendant stand on a chair near by and pour ice water upon the patient from a garden watering pot.

While the patient is insensible no attempt should be made to give anything by the mouth; but half a pint of milk and two raw eggs with a pinch of salt may be injected into the rectum every eight hours, after washing it out with cold water on each occasion. Two tablespoonfuls of whisky may be added to the injection, if the pulse is weak. If the urine is not passed spontaneously, it will be necessary to draw it once in eight hours with a soft rubber catheter which has been boiled ten minutes and lubricated with glycerin or clean vaseline.

ELECTRIC SHOCK OR LIGHTNING STROKE.

First Aid Rule 1.—Protect yourself from being shocked by the victim. Grasp victim only by coat tails or dry clothes. Put rubber boots on your hands, or work through silk petticoat; or throw loop of rubber suspenders or of dry rope around him to pull him off wire, or pry him along with dry stick.

Rule 2.—Do not lift, but drag victim away from wire toward the ground. When free from wire, hold him head downward for two minutes.

Rule 3.—Assist heart to regain its strength. Apply mustard plaster (mustard and water) to chest over heart; wrap in blanket wrung out of very hot water; give hypodermic of whisky, thirty minims.

Rule 4.—Induce artificial respiration. Open his mouth and grasp tongue, pull it forward just beyond lips, and hold it there. Let another assistant

Electric Shock or Lightning Stroke

grasp the arms just below the elbows and draw them steadily upward by the sides of the patient's head to the ground, the hands nearly meeting (which enlarges the capacity of the chest and induces inspiration, Fig. 2). While this is being done, let a third assistant take position astride the patient's hips with his elbows resting on his own knees, his hands extended, ready for action. Next, let the assistant standing at the head turn down the patient's arms to the sides of the body, the assistant holding the tongue changing hands, if necessary, to let the arms pass. Just before the patient's hands reach the ground, the man astride the body will grasp the body with his hands, the ball of the thumb resting on either side of the pit of the stomach, the fingers falling into the grooves between the short ribs. Now, using his knees as a pivot, he will at the moment the patient's hands touch the ground throw (not too suddenly) all his weight forward on his hands, and at the same time squeeze the waist between them, as if he wished to force something in the chest upward out of the mouth; he will deepen the pressure while he slowly counts one, two, three, four (about five seconds), then suddenly lets go with a final push, which will send him back to his first position. This completes expiration. (A child or delicate person must be more gently handled.)

At the instant of letting go, the man at the patient's head will again draw the arms steadily upward to the sides of the patient's head, as before (the assistant

holding the tongue again changing hands to let the arms pass, if necessary), holding them there while he slowly counts one, two, three, four (about five seconds).

Repeat these movements deliberately and perseveringly twelve to fifteen times in every minute—thus imitating the natural motions of breathing. Continue the artificial respiration from one to four hours, or until the patient breathes; and for a while, after the appearance of returning life, carefully aid the first short gasps until deepened into full breaths.

Keep body warm with hot-water bottles, hot bricks to limbs and feet, and blankets over exposed lower part of body.

Rule 5.—Treat burn, if any. If skin is not broken, cover burn with cloths wet with Carron oil (equal parts of linewater and linseed or olive oil). If skin is broken, or raw surface is exposed, spread over it paste of equal parts of boric acid and vaseline; and bandage over all.

Conditions, Etc.—A shock produced by contact with an electric current is not of rare occurrence. Lightning stroke is very uncommon; statistics show that in the United States each year there is one death from this cause to each million of inhabitants. There are several conditions which must be borne in mind when considering the accidental effect of an electric current. The pressure and strength of the current

Electric Shock or Lightning Stroke

(voltage and amperage) are often not nearly so important in regard to the effects on the body, as the area, duration, and location of the points of contact with the current, and the resistance offered by clothing and dry skin to the penetration of the electricity.

When the heart lies in the course of the circuit, the danger is greatest. A dog can be killed by a current of ten volts pressure when contacts are made to the head and hind legs, because the current then flows through the heart, while a current of eighty volts is required to kill a dog, under the same conditions, if contacts are made to head and fore leg. In a general way alternating currents of low frequency are the most injurious to the body, and any current pressure higher than two hundred volts is dangerous to life. On the other hand, a current of ninety-five volts has proved fatal to a human being. In this case the circumstances were particularly unfavorable to the victim, as he was standing on an iron tank in boots wet with an alkaline solution, and probably studded on the soles with nails, when he came in accidental contact with an industrial current. Moreover, he was an habitual drunkard. In an instance of the contrary sort, a man received a current of 1,700 volts (periodicity about 130) for fifty seconds, in one of the early attempts at electro-execution, without being killed. The personal equation evidently enters into the matter. A strong physique here, as in other cases, is most favorable in resisting the effects of electric shock.

High-pressure alternating currents (1,300 to 2,000 volts) are employed in electro-executions, and the contacts are carefully made, so that the current will enter the brain and pass through the heart to the leg. The two most vital parts are thus affected. In industrial accidents such nice adjustments are fortunately almost impossible, and shocks received from high-pressure currents, even of 25,000 volts, have not proved fatal because both the voltage and amperage have been greatly lessened through poor contacts and great resistance of clothing and dry skin, and also because the heart is not usually included in the circuit.

Death is induced in one of three ways: 1. Currents of enormous voltage and amperage, as occur in lightning, actually destroy, burst and burn the tissues through which the stroke passes. 2. Usually death follows accidents from industrial currents, owing to contraction of the heart, the effect being the same as observed on other muscles. The heart instantly ceases beating, and either remains absolutely quiet, or there is a fine quivering of some of its fibers, as seen on opening the chest in experiments upon animals. 3. A fatal issue may result from the passage of the current through the head, so affecting the nerve centers that govern respiration that the breathing ceases.

Symptoms.—These are generally muscular contractions, faintness, and unconsciousness (sometimes convulsions, if the current passes through the head), with failure of pulse and of breathing. For instance, a man

Electric Shock or Lightning Stroke

who was removing a brush from a trolley car touched, with the other hand, a live rail. His muscles immediately contracted throwing him back, and disconnecting him from contact with the current (500 volts). He then fainted and became unconscious for a short time. The pulse was rapid and feeble, and the breathing also at first, but it later became slower than usual. On regaining sensibility the patient vomited and got on his feet, although feeling very weak for two hours. Unconsciousness commonly lasts only a few moments in nonfatal cases, but may continue for hours, its continuance being rather a favorable sign of ultimate recovery, if the heart and lungs are acting sufficiently. Bad after effects are rare. It is not uncommon for the patient to declare that the accident had improved his general feelings. Occasionally there is temporary loss of muscular power, and a case has been reported of nervous symptoms following electric shock similar to those observed after any accidental violence. Burns of varying degrees of intensity occur at the point of entrance of the current, from slight blisters to complete destruction of all the tissues.

Treatment.—The treatment is completely outlined in the “first-aid” directions. Should contact be unbroken, an order to shut off the electric current should at once be telephoned to the station. Protection of the rescuer with thick rubber gloves is of course the ideal safeguard.

In fatal cases the heart is instantaneously arrested,

and nothing can be done to start it into action. If the current passes through the brain, by contact with the head or neck, then failure of breathing is more apt to be the cause of death. Theoretically, it is in the latter event only that treatment, i. e., artificial respiration, will be of avail.

But as in any individual case the exact condition is always a matter of doubt, *artificial respiration* is the most valuable remedial measure we possess; it should always be practiced for hours in doubtful cases. Two tablespoonfuls of brandy or whisky in a cup of warm water may be injected into the bowel, if a hypodermic syringe is not available and the patient needs decided stimulation.

CHAPTER III

Wounds, Sprains and Bruises

*Treatment of Wounds—Rules for Checking Hemorrhage—Lockjaw—
—Bandages for Sprains—Synovitis—Bunions and Felons—
Foreign Bodies in the Eye, Ear and Nose.*

WOUNDS.—A wound is a condition produced by a forcible cutting, contusing, or tearing of the tissues of the body, and includes, in its larger sense, bruises, sprains, dislocations, and breaks or fractures of bones. As ordinarily used, a wound is an injury produced by forcible separation of the skin or mucous membrane, with more or less injury to the underlying parts.

The main object during the care of wounds should be to avoid contamination with anything which is not surgically clean, from the beginning to the end of the dressing; otherwise, every other step in the whole process is rendered useless.

Three essentials in the treatment of wounds are:
1. The arrest of bleeding. 2. Absolute cleanliness.
3. Rest of the injured part. Dangerous bleeding demands immediate relief.

Bleeding is of three kinds: 1. From a large artery.
2. From a vein. 3. General oozing.

BLEEDING FROM LARGE ARTERY IN SPURTS OF BRIGHT BLOOD.

First Aid Rule 1.—Speed increases safety. Put patient down flat. Make pressure with hands between the wound and the heart till surgeon arrives, assistants taking turns.

Rule 2.—If arm or leg, tie rubber tubing or rubber suspenders tight about limb between wound and heart, or tie strap or rope over handkerchief or folded shirt wrapped about limb. If arm, put baseball in arm pit, and press arm against this. Or, for arm or leg, tie folded cloth in loose noose around limb, put cane or umbrella through noose and twist up the slack very tight, so as to compress the main artery with knot.

Rule 3.—Keep limb and patient warm with hot-water bottles till surgeon arrives.

This treatment is of course only a temporary expedient, as it is essential for a surgeon to tie the bleeding vessel itself; therefore a medical man should be summoned with all dispatch.

BLEEDING FROM VEIN; STEADY FLOW OF DARK BLOOD.

First Aid Rule 1.—Make firm pressure with pad of cloth directly over wound, also with hands between wound and extremity, that is, on side of cut away from the heart.

Bleeding From Vein

Rule 2.—Tie tight bandage about limb at this point, with rubber tubing or suspenders.

Rule 3.—Keep limb and patient warm with hot-water bottles till surgeon arrives.

In the cases of bleeding from a vein, the flow of blood is continuous, and is of a dark, red hue, and does not spurt in jets, as from an artery. This kind of bleeding is not usually difficult to stop, and it is not necessary that the vein itself be tied—unless very large—provided that the wound be snugly bandaged after it is dressed. After the first half hour, release the limb and see if the bleeding has stopped. If so, and the circulation is being interfered with, owing to the tightness of the bandage, reapply the bandage more loosely.

In the case of an injured artery of any considerable size, the amount of pressure required to stop the bleeding will arrest all circulation of blood in the limb, so that great damage, as well as pain, will ensue if it be continued more than an hour or two, and during this time the limb should be kept warm by thick covering and hot-water bags, if they can be obtained.

Bleeding *from a deep puncture* may be stopped by plugging the cavity with strips of muslin which have been boiled, or with absorbent cotton, similarly treated, keeping the plug in place by snug bandaging.

BLEEDING FROM PUNCTURED WOUND.

First Aid Rule 1.—*Extract pin, tack, nail, splinter, thorn, or bullet, IF YOU CAN SEE BULLET; do not probe.*

Rule 2.—*Pour warm water on wound and squeeze tissue to encourage bleeding. Send for small hard-rubber syringe.*

Rule 3.—*If deep, plug it with absorbent cotton, and put tight bandage over plug. If shallow, cover with absorbent cotton wet with boric-acid solution (one dram to one-half pint of water), or carbolic-acid solution (one teaspoonful to the pint of hot water).*

Rule 4.—*When syringe comes, remove dressing, and clean wound by forcibly syringing carbolic solution directly into wound. Replace dressing.*

A small punctured wound should be squeezed in warm water to encourage bleeding and, if pain and swelling ensue, absorbent cotton soaked in a boric-acid solution (containing as much boric acid as the water will dissolve) or in carbolic-acid solution (one teaspoonful of pure acid to the pint of warm water) should be applied over the wound and covered with oil silk or rubber or enamel cloth for a few days, or until the soreness has subsided. The dressing should be wet with the solution as often as it becomes dry. Punctures by nails, especially if deep, should be washed out with a syringe, using one of the solutions just mentioned. A medicine dropper, minus the rubber part, attached to a fountain syringe, makes a good nozzle

Bleeding in Form of Oozing

for this purpose. A moist dressing, like the one described, should then be applied, and the limb kept in perfect rest for a few days.

When a surgeon's services are available, however, self-treatment is attended with too much danger, as a thorough opening up of such wounds with proper cleansing and drainage will afford a better prospect of early recovery, and avert the risk of serious inflammation and lockjaw, which sometimes follow punctured wounds of the hands and feet. Foreign bodies, as splinters, may be removed with tweezers or a needle, being careful not to break the splinter in the attempt. If a part remains in the flesh, or if the foreign body is a needle that cannot be found or removed at once, the continuous application of a hot flaxseed or other poultice will lead to the formation of "matter," with which the splinter or needle will often escape after a few days. Splinters finding their way under the nail may be removed by scraping the nail very thin over the splinter and splitting it with a sharp knife down to the point where the end of the splinter can be grasped.

BLEEDING IN FORM OF OOZING.

First Aid Rule 1.—*Apply water as hot as hand can bear.*

Rule 2.—*Elevate the part, and drench with carbolic solution (one teaspoonful of carbolic acid to one pint of hot water).*

Rule 3.—Bandage snugly while wet.

Rule 4.—Keep patient warm with hot-water bottles.

GENERAL OOZING happens in the case of small wounds or from abraded surfaces, and is caused by the breaking of numerous minute vessels which are not large enough to require the treatment recommended for large arteries or veins. It is rarely dangerous, and usually stops spontaneously. When the loss of blood has been considerable, so that the patient is pale, faint, and generally relaxed, with cold skin, and perhaps nausea and vomiting, he should be stripped of all clothing and immediately wrapped in a blanket wrung out of hot water, and then covered with dry blankets. Heat should also be applied to the feet by means of hot-water bags or bottles, with great care not to burn a semiconscious patient's skin. The head should be kept low, and two tablespoonfuls of brandy, whisky, or other alcoholic liquor should be given in a half cup of hot water by the mouth, if the patient can swallow. If much blood has been lost a quart of water, as hot as the hand can readily bear, and containing a teaspoonful of common salt, should be injected by means of a fountain syringe into the rectum.

Somewhat the condition just described as due to loss of blood may be caused simply by shock to the nervous system following any severe accident, and not attended by bleeding. The treatment of shock is, however, practically the same as that for hemorrhage, and

Lockjaw

improvement in either case is shown by return of color to the face and strength in the pulse. Bleeding is apt to be much less in badly torn than in incised wounds, even if large vessels are severed, as when the legs are cut off in railroad accidents, for the lacerated ends of the vessels become entangled with blood and favor clotting.

LOCKJAW.—In the lesser injuries, where bleeding is not an important feature, and in all wounds as well, after bleeding has been stopped, the main object in treatment consists in cleansing wounds of the germs which cause “matter” or pus, general blood poisoning, and lockjaw. The germs of the latter live in the earth, and even the smallest wounds which heal perfectly may later give rise to lockjaw if dirt has not been entirely removed from the wound at the time of accident. Injuries to the hands caused by pistols, firecrackers, and kindred explosives, seem especially prone to produce lockjaw, and fatalities from this disorder are deplorably numerous after Fourth-of-July celebrations in the United States.

The wounds producing lockjaw usually occur in children who explode blank cartridges in the palm of the hand. In this way the germs of the disease are forced in with parts of the dirty skin and more or less of the wad from the shell. Since lockjaw is so frequent after these accidents, and so fatal, it is impossible to exert too much care in treatment. The wound should at once be thoroughly opened with a knife to the very

bottom, under ether, by a surgeon, and not only every particle of foreign matter removed, but all the surrounding tissue should be cut out or cauterized. In addition, it is wise to use an injection under the skin of tetanus-antitoxin, to prevent the disease. Proper restriction of the sale of explosives alone will put a stop to this barbarous mode of exhibiting patriotism.

Treatment.—It is not essential to use chemical agents or antiseptics to rid wounds of germs and so secure uninterrupted healing. The person who is to dress the wound should prepare to do so at the earliest possible moment after giving first aid. He should proceed promptly to boil some pieces of absorbent cotton, as large as an egg, together with a nail brush in water. Some strips of clean cotton cloth may be used in the absence of absorbent cotton. The boiling should be conducted for five minutes, when the basin or other utensil in which the brush and cotton are boiled should be taken off the fire and set aside to cool. Then the attendant should scrub his own hands for five minutes in hot water with soap and brush.

He next takes the brush, which has been boiled, out of the water and cleans the patient's skin for a considerable distance about the wound. When this is done, and the water and cotton which have been boiled are sufficiently cool, the wound should be bathed with the cotton and boiled water until all foreign matter has been removed from the wound; not only dirt which can be seen, but germs which cannot be seen. Some

Lockjaw

of the boiled cotton cloth or absorbent cotton, wet as it is, should be placed over the wound and the whole covered by a bandage. Large gaping wounds are of course more properly closed by stitches, but very deep wounds should be left partly open, so that the discharge may drain away freely. Small, deep, punctured wounds are not to be closed at all, but should be sedulously kept open by pushing in strips of boiled cotton cloth, in order to secure drainage.

If the attendant has the requisite confidence, there is no reason why he should not attempt stitching a wound, providing the patient is willing, and a surgeon cannot be obtained within twenty-four hours. In this case a rather stout, common sewing needle or needles are threaded with black or white thread, preferably of silk, and, together with a pair of scissors and a clean towel, are boiled in the same utensil with the cotton and the nail brush. After the operator has scrubbed his hands and cleansed the wound, he places the boiled towel about the wound so that the thread will fall on it during his manipulations and not on the skin. The needle should be thrust into and through the skin, but no lower than this, and should enter and leave the skin about a quarter of an inch from either edge of the wound. The stitches are placed about one-half inch apart, and are drawn together and tied tightly enough to join the two edges of the wound. The ends of the thread should be cut about one-half inch from the knot, being careful while using the needle

and scissors not to lay them down on anything except the boiled towel. The wound is then covered with cotton, which has been boiled as described above, bandaged and left undisturbed for a week, if causing no pain. At the end of this time the stitches are taken out after the attendant has washed his hands carefully, and boiled his scissors as before.

Court plaster or plaster of any kind is a bad covering or dressing for wounds, as it may be itself contaminated with germs. It effectually keeps in any with which the wound is already infected, and prevents proper drainage.

It is impossible in a work of this kind to describe the details of the after treatment of wounds, as this can only be properly undertaken by a surgeon, owing to the varying conditions which may arise. In general it may be stated that the same cleanliness and care should be followed during the whole course of healing as has been outlined for the first attempt at treatment.

If the wound is small, and there is no discharge from it, it may be painted with collodion or covered with boric-acid ointment (sixty grains of boric acid to the ounce of vaseline) after the first day. If large, it should be covered with cotton gauze or cloth which have been boiled or specially prepared for surgical purposes. If pus ("matter") forms, the wound must be cleansed daily of discharge (more than once if it is copious) with boiled water, or best with Hydrogen-

Bleeding From Scalp

dioxide solution followed by a washing with a solution of carbolic acid (one teaspoonful to the pint of hot water), or with a solution of mercury bichloride, dissolving one of the larger bichloride tablets, sold for surgical uses, in a quart of water.

It is a surgical maxim never to be neglected that wounds should not be allowed to close at the top before healing is completed at the bottom. As to close at the surface is the usual tendency in wounds that heal slowly and discharge pus, it is necessary at times to enlarge the external opening by cutting or stretching with the blades of a pair of scissors, or, and this is much more rational and comfortable for the patient, by daily packing the outlet of the wound with gauze to keep it open.

BLEEDING FROM SCALP.

First Aid Rule 1.—Cut hair off about wound, and clean thoroughly with carbolic-acid solution (one teaspoonful to pint of hot water).

Rule 2.—Put pad of gauze or muslin directly over wet wound, and make pressure firmly with bandage.

In case of wounds of the scalp, or other hairy parts, the hair should be cut, or better shaved, over an area very much larger than the wounded surface, after which the cleansing should be done. To stop bleeding of the scalp, water is applied as hot as can be borne, and then a wad of boiled cotton should be placed in the

wound and bandaged down tightly into it for a time. Closing the wound with stitches will stop the bleeding much more effectively, however, and is not very painful if done immediately after the accident. The stitches should be tied loosely, and not introduced nearer to each other than half an inch, to allow drainage of discharge from the wound.

General Remarks.—All wounds should be kept at rest after they are dressed. This is accomplished in the case of the lower limbs by keeping the patient in bed with the leg raised on a pillow.

The same kind of treatment applies in severe injuries of the hands. In less serious cases a sling may be employed, and the patient may walk about. When the injury is near a joint, as of the fingers, knee, wrist, or elbow, a splint made of thin board or tin (and covered with cotton wadding and bandaged) should be applied by means of surgeon's adhesive plaster and bandage after the wound has been dressed. In injuries of the hand the splint should be applied to the palm side, and reach from the finger tips to above the wrist. Use a splint also.

NOSEBLEED.

First Aid Rule 1.—*Seat patient erect and apply ice to nape of neck.*

Rule 2.—*Put roll of brown paper under upper lip, and press lip firmly against it. Press facial artery against lower jaw of bleeding side, till bleeding stops.*

Bruise

This artery crosses lower edge of jawbone one inch in front of angle of jaw.

Rule 3.—Plug nostril with strip of thin cotton or muslin cloth.

Rule 4.—Do not wash away clots; encourage clotting to close nostril.

**BLEEDING FROM LUNGS; BRIGHT BLOOD
COUGHED UP.**

**BLEEDING FROM STOMACH; DARK BLOOD
VOMITED.**

First Aid Rule for both. Let patient lie flat and swallow small pieces of ice, and also take one-quarter teaspoonful of table salt in half a glass of cold water.

BRUISE.

First Aid Rule 1.—Bandage from tips of fingers, or from toes, making same pressure with bandage all the way up as you do over the injury.

Rule 2.—Apply heat through the bandage, over the injury, with hot-water bottles.

Cause, Etc.—A bruise is a hidden wound; the skin is not broken. It is an injury caused by a blunt body so that, while the tougher skin remains intact, the parts beneath are torn and crushed to a greater or lesser extent. The smaller blood vessels are torn and blood escapes under the skin, giving the "black-and-blue" appearance so common in bruises of any severity.

Sometimes, indeed, large collections of blood form beneath the skin, causing a considerable swelling.

Use of the bruised part is temporarily limited. Pain, faintness, and nausea follow severe bruises, and, in case of bad bruises of the belly, death may even ensue from damage to the viscera or to the nerves. Dangerous bleeding from large blood vessels sometimes takes place internally, and collections of blood may later break down into abscesses. Furthermore, the bruise may be so great that the injury to muscle and nerve may lead to permanent loss of use of the part. For these reasons a surgeon's advice should always be sought in cases of bad bruises. Pain is present in bruises, owing to the tearing and stretching of the smaller nerve fibers, and to pressure on the nerves caused by swelling. The swelling is produced by escape of blood and fluid from the torn blood vessels.

Treatment.—Even slight and moderate bruises should be treated by rest of the injured part. A splint insures the rest of a limb (see treatment of Fractures, p. 80). One of the best modes of treatment is the snug application of a flannel bandage which secures a certain amount of rest of the part to which it is applied, and aids in preventing further swelling. Where bandaging is not feasible, as in certain parts of the body, or before bandaging in any kind of a bruise, the use of a cold compress is advisable. One layer of thin cotton or linen cloth should be wet in ice water, and should be put on the bruised part and continually

Abrasions

changed for newly moistened pieces as soon as the first grows warm. Alcohol and water, of each equal parts, may be used in the same manner to advantage.

When cold is unavailable or unpleasant to the patient, several layers of cotton cloth may be wrung out in very hot water and applied to the part with frequent renewal. The value attributed to witch-hazel and arnica is mainly due to the alcohol contained in their preparations. Cataplasma Kaolini (U. S. P.) is an excellent remedy for simple bruises when spread thickly on the part and covered with a bandage. An ointment containing twenty-five per cent of ichthyol is also a useful application. Following severe bruises, the damaged parts should be kept warm by the use of hot-water bags, or by covering a limb with cotton wool and bandage, until such time as surgical advice may be obtained.

When the pain and swelling of bruises begin to subside, treatment should be pursued by rubbing with liniment of ammonia or chloroform, or vaseline if these are not obtainable. Moderate exercise of the part is desirable.

ABRASIONS.—When the surface skin is scraped off, as often happens to the shin, knee, or head, an ointment containing sixty grains of boric acid to the ounce of vaseline makes a good application, and this may be covered with a bandage. The same ointment is useful to apply to small wounds and cuts after the first bandage is removed.

SPRAIN; NO DISPLACEMENT OF BONES.

First Aid Rule 1.—Immerse in water, hot as hand can bear, for half an hour.

Rule 2.—Dry and strap with adhesive plaster, if you know how. If not, bandage snugly, beginning with tips of fingers or with toes, and make same pressure all the way up that you do over injury.

Rule 3.—Rest. If ankle or knee is hurt, patient must go to bed.

Conditions, Etc.—A sprain is an injury caused by a sudden wrench or twist of a joint, producing a momentary displacement of the ends of the bones to such a degree that they are forced against the membrane and ligaments surrounding the joint, tearing one or both to a greater or less extent. The wrist and ankle are the joints more commonly sprained, and this injury is more likely to occur in persons with flabby muscles and relaxed ligaments, as in the so-called “weak-ankled.” The damage to the parts holding the joint in place may be of any degree, from the tearing of a few fibers of the membrane enwrapping the joint to its complete rupture, together with that of the ligaments, so that the bones are no longer in place, the joint loses its natural shape and appearance, and we have a condition known as dislocation. In a sprain then, the twist of the joint produces only a temporary displacement of the bones forming the joint, sufficient to damage the soft structures around it, but not suffi-

Sprain

cient to cause lasting displacement of the bones or dislocation.

It will be seen that whether a sprain or dislocation results, depends upon the amount of injury sustained. Since it often happens that the bone entering into the joint is broken, it follows that whenever what appears to be a severe sprain occurs, with inability to move the joint and great swelling, it is important to secure surgical aid promptly. Since the discovery of the X-ray many injuries of the smaller bones of the wrist and ankle joint, formerly diagnosed as sprains by the most skillful surgeons, have, by its use, been discovered to be breaks of the bones which were impossible of detection by the older methods of examination.

Symptoms.—The symptoms of sprain are sudden, severe pain, often accompanied by faintness and nausea, swelling, tenderness, and heat of the injured parts. The sprained joint can be only moved with pain and difficulty. The swelling is due not so much to leaking of blood from broken blood vessels as to filling up of the joint with fluid caused by the inflammation, although in a few days after a severe sprain the skin a little distance below the injury becomes “black and blue” from escape of blood caused by the injury.

Treatment.—Since the treatment of severe sprains means first the discrimination between dislocation, a break of bone, and a rupture of muscle, ligament, or tendon, it follows that the methods herein described for treatment should only be employed in slight unmis-

takable sprains, or until a surgeon can be secured, or when one is unavailable. Nothing is better than immediate immersion of the sprained joint in as hot water as the hand can bear for half an hour. Following this, an elastic bandage of flannel cut on the bias about three and one-half inches wide should be snugly applied to the limb, beginning at the finger tips or at the toes and carrying the bandage some distance above the injured joint.

In bandaging a part there is always danger of applying the bandage too tightly, especially if the parts swell under the bandage. If this happens, there is increase of pain which may be followed by numbness of the limb and, what is still more significant, coldness and blueness of the extremities below the bandage, particularly of the fingers and toes. In such cases the bandage must be removed and reapplied with less force. If the ankle or knee be sprained the patient must go to bed for at least twenty-four hours, and give the limb a complete rest.

When the wrist or shoulder is sprained the arm should be confined in a sling. In the more serious cases the injured joint should be fixed in a splint before bandaging. An injured elbow joint is held at a right angle by a pasteboard splint, a bandage, and a sling, while the knee and wrist are treated with the limb in a straight line, as far as possible.

In the case of the knee, the splint is applied to the back of the leg; in sprained wrist, to the palm of the

Sprain

hand and same side of the forearm. Sheet wadding, which may be bought at any drygoods store, is torn into strips about two inches wide and sewed together forming a bandage ten or fifteen feet long, and this is first wound about the sprained joint. Then pieces of millboard or heavy pasteboard are soaked in water and applied while wet in long strips about three inches wide over the wadding, and the whole is covered with bandage. In the case of the knee it is better to use a strip of wood for the splint, reaching from the lower part of the calf to four inches above the knee. It should be from a quarter to half an inch thick, a little narrower than the leg, and be padded thickly with sheet wadding. It is held in place by strips of surgeon's adhesive plaster, about two inches wide, passed around the whole circumference of the limb above and below the knee joint, and covered with bandage.

In ordinary sprains of the ankle, uncomplicated by broken bone or ligament, it is possible for the patient, after resting in bed for a day, to go about on crutches, without bearing any weight on the foot until the third day after the accident. The treatment in the meanwhile consists in immersing the sprained ankle alternately, first in hot water for five minutes and then in cold water for five minutes, followed by rubbing of the parts about the injured joint with chloroform liniment for fifteen minutes, but not at the beginning touching the joint itself. The rubbing should be done by an assistant very gently the first day, with gradual

increase in vigor as the days pass, not only kneading the ankle but moving the joint.

This treatment should be pursued once daily, and followed by bandaging with a flannel bandage cut on the bias three and a half inches wide. With this method it is possible for the patient to regain the moderate use of the ankle in about two or three weeks.

The same general line of treatment applies to the other joints; partial rest and daily bathing in hot and cold water, rubbing and movements of the joint by an assistant. Since sprains vary in severity it follows that some may need only the first day's preliminary treatment prescribed to effect a cure, while others may require fixation by a surgeon in a plaster-of-Paris splint for some time, with additional treatment which only his special knowledge can supply.



This picture shows an excellent method of fixing a sprained joint, used by Prof. Virgil P. Gibney, M.D., Surgeon-in-Chief of the N. Y. Hospital for Ruptured and Crippled. It consists of strapping the joint by means of long, narrow strips of adhesive plaster incasing it immovably in the normal position. This procedure may be followed by anyone who has seen a surgeon practice it.

SYNOVITIS—Severe Injury.—Generally of ankle or knee from fall, or shoulder from blow.

First Aid Rule 1.—Provide large pitcher of hot water and large pitcher of cold water and basin. Hold

Synovitis

joint over basin; pour hot water slowly over joint. Return this water to pitcher. Pour cold water over joint. Return water to pitcher. Repeat with hot water again, and follow with cold. Continue this alternation for half an hour.

Rule 2.—Put to bed, with hot-water bottles about joint, and wedge immovably with pillows.

Rule 3.—When tenderness and heat subside, strap with adhesive plaster in overlapping strips.

Conditions, Etc.—This condition, which may affect almost any freely movable joints, as the knee, elbow, ankle, and hip, is commonly caused by a wrench, blow, or fall. Occasionally it comes on without any apparent cause, in which case there is swelling and but slight pain or inflammation about the joint. We shall speak of synovitis of the knee ("water on the knee"), as that is the most common form, but these remarks will apply almost as well to the other joints. In severe cases there are considerable pain, redness and heat, and great swelling about the knee. The swelling is seen especially below the kneecap, on each side of the front of the joint, and also often above the kneecap. Frequently the only signs of trouble are swelling with slight pain, unless the limb is moved.

Treatment.—If the knee is not red, hot, or tender to the touch, it will not be necessary for the patient to remain in bed, but when these symptoms are present a splint of some sort must be applied so that the leg

is kept nearly straight, and the patient must keep to his bed until the heat, redness, and tenderness have subsided. In the meantime either an ice bag, hot poultice, cloths wrung out in hot water, or a hot-water bag should be kept constantly upon the knee.

A convenient splint consists of heavy pasteboard wet and covered with sheet wadding (or cotton batting) shaped and affixed to the back of the leg, from six inches below to four inches above the joint, by strips of adhesive plaster, as shown in the illustration, and then by bandage, leaving the knee uncovered for applications. A wooden splint well padded may be used instead.

In mild cases without much inflammation, and in others after the tenderness and heat have abated, the patient may go about if the knee is treated as follows: a pad of sheet wadding or cotton batting about two inches thick and five inches long and as wide as the limb is placed in the hollow behind the knee, and then the whole leg is encircled with sheet wadding from six inches below to four inches above the knee, covering the joint as well as the pad. Beginning now five inches below the joint, strips of surgeon's adhesive plaster, an inch wide and long enough to more than encircle the limb, are affixed about the leg firmly like garters so as to make considerable pressure. Each strip or garter overlaps the one below about one-third of an inch, and the whole limb is thus incased in plas-

Bunion and Housemaid's Knee

ter from five inches below the knee to a point about four inches above the joint.

An ordinary cotton bandage is then applied from below over the entire plaster bandage. When this arrangement loosens, the plaster should be taken off and new reapplied, or a few strips may be wound about the old plaster to reënforce it. The patient may walk about with this appliance without bending the knee.

When the swelling has nearly departed, the plaster may be removed and the knee rubbed twice daily about the joint and the joint itself moved to and fro gently by an attendant, and then bandaged with a flannel bandage. Painting the knee with tincture of iodine in spots as large as a silver dollar is also of service at this time. The knee should not be bent in walking until it can be moved by another person without producing discomfort.

Such treatment may be applied to the other joints in a general way. The elbow must be fixed by a splint as recommended for dislocation of the joint (p. 128). The ankle is treated as advised for sprain of that joint (p. 68). When a physician can be obtained no layman is justified in attempting to treat a case of water on the knee or similar affection of other joints.

BUNION AND HOUSEMAID'S KNEE.—Bunion is a swelling of the bursa, or cushion, at the first joint of the great toe where it joins the foot. It may not give much trouble, or it may be hot, red, tender, and very painful. It is caused by pressure of a tight

boot which also forces the great toe toward the little toe, and thus makes the great toe joint more prominent and so the more readily injured.

A somewhat similar swelling, often as large as an egg, is sometimes seen over the kneecap, more often in those who work upon their knees, hence the name housemaid's knee. The swelling may come on suddenly and be hot, tender, and painful, or it may be slow in appearing and give little pain.

Treatment.—The treatment for the painful variety of bunion and housemaid's knee is much the same: absolute rest with the foot kept raised, and application of cloths kept constantly wet with ice or cold water; or a thick covering of Cataplasma Kaolini (U. S. P.) may be applied until the inflammation has subsided. If the trouble is chronic, or the acute inflammation does not soon abate under the treatment advised, the case is one for the surgeon, and sometimes requires the knife for abscess formation. In the milder cases of bunion, wearing proper shoes whose inner border forms almost a straight line from heel to toe, so that the great toe is not pushed over toward the little toe, and painting the bunion every few days with tincture of iodine, until the skin begins to become sore, will often be sufficient to secure recovery.

RUN-AROUND; WHITLOW OR FELON.—

“Run-around” consists in an inflammation of the soft parts about the finger nail. It is more common in the weak, but may occur in anyone, owing to the entrance

Run-Around

of pus germs through a slight prick or abrasion which may pass unnoticed. The condition begins with redness, heat, tenderness, swelling, and pain of the flesh at the root of the nail, which extends all about the nail and may be slight and soon subside, or there may be great pain and increased swelling, with the formation of "matter" (pus), and result in the loss of the nail, particularly in the weak.

Whitlow or felon is a much more serious trouble. It begins generally as a painful swelling of one of the last joints of the fingers on the palm side. Among the causes are a blow, scratch, or puncture. Often there is no apparent cause, but in some manner the germs of inflammation gain entrance. The end of the finger becomes hot and tense, and throbs with sometimes almost unbearable pain. If the inflammation is chiefly of the surface there may be much redness, but if mainly of the deeper parts the skin may be but little reddened or the surface may be actually pale. There is usually some fever, and the pain is made worse by permitting the hand to hang down. If the felon is on the little finger or thumb the inflammation is likely to extend down into the palm of the hand, and from thence into the arm along the course of the tendons or sinews of the muscles. Death of the bone of the last finger joint necessitating removal of this part, stiffness, crippling, and distortion of the hand, or death from blood poisoning may ensue if prompt surgical treatment is not obtained.

Treatment.—At the very outset it may be possible to stop the progress of the felon by keeping the finger constantly wet by means of a bandage continually saturated with equal parts of alcohol and water, at night keeping it moist by covering with a piece of oil silk or rubber. Tincture of iodine painted all over the end of the finger is also useful, and the hand should be carried in a sling by day, and slung above the head to the headboard of the bed by night. If after twenty-four hours the pain increases, it is best to apply hot poultices to the finger, changing them as often as they cool. If the felon has not begun to abate by the end of forty-eight hours, the end of the finger must be cut lengthwise right down to the bone by a surgeon to prevent death of the bone or extension of the inflammation. Poultices are then continued.

“Run-around” is treated also by iodine, cold applications, and, if inflammation continues, by hot poulticing and incision with a knife; but poulticing is often sufficient. Attention to the general health by a physician will frequently be of service.

WEEPING SINEW; GANGLION.—This is a swelling as large as a large bean projecting from the back or front of the wrist with an elastic or hard feeling, and not painful or tender unless pressed on very hard. After certain movements of the hand, as in playing the piano or, for example, in playing tennis, some discomfort may be felt. Weeping sinew sometimes interferes with some of the finer movements of the hand. The

Foreign Bodies in the Eye

swelling is not red or inflamed, but of the natural color of the skin. It does not continue to increase after reaching a moderate size, but usually persists indefinitely, although occasionally disappearing without treatment. The swelling contains a gelatinous substance which is held in a little sac in the sheath of the tendon or sinew, but the inside of the sac does not communicate with the interior of the sheath surrounding the tendon.

Treatment.—This consists in suddenly exerting great pressure on the swelling with the thumb, or in striking it a sharp blow with a book by which the sac is broken. Its contents escape under the skin, and in most cases become absorbed. If the swelling returns a very slight surgical operation will permanently cure the trouble.

CINDERS AND OTHER FOREIGN BODIES IN THE EYE.¹—Foreign bodies are most frequently lodged on the under surface of the upper lid, although the surface of the eyeball and the inner aspect of the lower lid should also be carefully inspected. A drop of a two per cent solution of cocaine will render painless the manipulations. The patient should be directed to continue looking downward, and the lashes and edge of the lid are grasped by the forefinger and thumb of the right hand, while a very small pencil is gently

¹ The Editors have deemed it advisable to repeat here the following instructions, also occurring in Vol. II, Part J, for the removal of foreign bodies in the eye, ear, and nose, as properly coming under the head of "First Aid in Emergencies."

pressed against the upper part of the lid, and the lower part is lifted outward and upward against the pencil so that it is turned inside out. The lid may be kept in this position by a little pressure on the lashes, while the cinder, or whatever foreign body it may be, is removed by gently sweeping it off the mucous membrane with a fold of a soft, clean handkerchief. (See Figs. 6 and 7.)

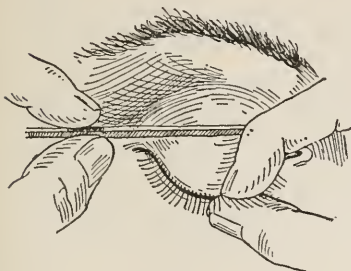


FIG. 6.

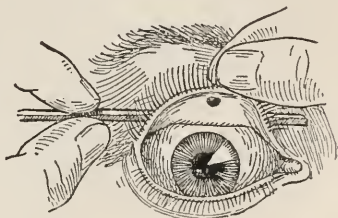


FIG. 7.

REMOVING A FOREIGN BODY FROM THE EYE.

In Fig. 6 note how lashes and edge of lid are grasped by forefinger and thumb, also pencil placed against lid; in Fig. 7 lid is shown turned inside out over pencil.

Hot cinders and pieces of metal may become so deeply lodged in the surface of the eye that they cannot be removed by the method recommended, or by using a narrow slip of clean white blotting-paper. All such cases should be very speedily referred to a physician, and the use of needles or other instruments should not be attempted by a layman, lest permanent damage be done to the cornea and opacity result. Such procedures

Foreign Bodies in the Ear

are, of course, appropriate for an oculist, but when it is impossible to secure medical aid for days it can be attempted without much fear, if done carefully, as more harm will result if the offending body is left in place. It is surprising to see what a hole in the surface of the eye will fill up in a few days. If the foreign body has caused a good deal of irritation before its removal, it is best to drop into the eye a solution of boric acid (ten grains to the ounce of water) four times daily.

FOREIGN BODIES IN THE EAR.—Foreign bodies, as buttons, pebbles, beans, cherry stones, coffee, etc., are frequently placed in the ear by children, and insects sometimes find their way into the ear passage and create tremendous distress by their struggles. Smooth, nonirritating bodies, as buttons, pebbles, etc., do no particular harm for a long time, and may remain unnoticed for years. But the most serious damage not infrequently results from unskillful attempts at their removal by persons (even physicians unused to instrumental work on the ear) who are driven to immediate and violent action on the false supposition that instant interference is called for. Insects, it is true, should be killed without delay by dropping into the ear sweet oil, castor, linseed, or machine oil or glycerin, or even water, if the others are not at hand, and then the insect should be removed in half an hour by syringing as recommended for wax (Vol. II, p. 35).

To remove solid bodies, turn the ear containing the body downward, pull it outward and backward, and

rub the skin just in front of the opening into the ear with the other hand, and the object may fall out.

Failing in this, syringing with warm water, as for removal of wax, while the patient is sitting, may prove successful. The essentials of treatment then consist, first, in keeping cool; then in killing insects by dropping oil or water into the ear, and, if syringing proves ineffective, in using no instrumental methods in an attempt to remove the foreign body, but in awaiting such time as skilled medical services can be obtained. If beans or seeds are not washed out by syringing, the water may cause them to swell and produce pain. To obviate this, drop glycerin in the ear which absorbs water, and will thus shrivel the seed.

FOREIGN BODIES IN THE NOSE.—Children often put foreign bodies in their noses, as shoe buttons, beans, and pebbles. They may not tell of it, and the most conspicuous symptoms are the appearance of a thick discharge from one nostril, having a bad odor, and some obstruction to breathing on the same side. If the foreign body can be seen, the nostril on the unobstructed side should be closed and the child made to blow out of the other one. If blowing does not remove the body it is best to secure medical aid very speedily.

CHAPTER IV

Fractures

*How to Tell a Broken Bone—A Simple Sling—Splints and Bandage,
—A Broken Rib—Fractures of Arm, Shoulder, Hand, Hips
Leg and Other Parts.*

BROKEN BONE; FRACTURE.¹

First Aid Rule 1.—Be sure bone is broken. If broken, patient can scarcely (if at all) move the part beyond the break, while attendant can move it freely in his hands. If broken, grating of rough edges of bone may be felt by attendant but should not be sought for. If broken, limb is generally shortened.

Rule 2.—Do not try to set bone permanently. Send at once for surgeon.

COMPOUND FRACTURE.

Important. If there is opening to the air from the break, because of tearing of tissues by end of bone, condition is very dangerous; first treatment may save life, by preventing infection. Before reducing fracture,

¹ The engravings illustrating the chapters on "Fractures" and "Dislocations" are from Buck's "Reference Handbook of Medical Science," published by William Wood & Co., New York; also, Scudder's "Treatment of Fractures" and "American Text-Book of Surgery," published by W. B. Saunders's Company, Philadelphia.

and without stirring the patient much, after scrubbing your hands very clean, note:

First Aid Rule 1.—If hairy, shave large spot about wound.

Rule 2.—Clean large area about wound with soap and water, very gently. Then wash most thoroughly again with clean water, previously boiled and cooled. Flood wound with cool boiled water.

Rule 3.—Cover wound with absorbent cotton (or pieces of muslin) which has been boiled. Then attend to broken bone, as hereafter directed, in the case of each variety of fracture.

After the bone is set, according to directions, then note:

Rule 4.—Renew pieces of previously boiled muslin from time to time, when at all stained with discharges. Every day wash carefully about wound, between the splints, with cool carbolic-acid solution (one teaspoonful to a pint of hot water) before putting on the fresh cloths.

BROKEN BONES OR FRACTURES.¹—It frequently happens that the first treatment of fracture devolves upon the inexperienced layman. Immediate treatment is not essential, in so far as the repair of the

¹ It should be distinctly understood that the information about fractures is not supplied to enable anyone to avoid calling a surgeon, but is to be followed only until expert assistance can be obtained and, like other advice in this book, is intended to furnish first-aid information or directions to those who are in places where physicians cannot be secured.

Broken Bones or Fractures

fracture is directly concerned, for a broken bone does not unite for several weeks, and if a fracture were not seen by the surgeon for a week after its occurrence, no harm would be done, provided that the limb were kept quiet in fair position until that time. The object of immediate care of a broken bone is to prevent pain and avoid damage which would ensue if the sharp ends of the broken bone were allowed to injure the soft tissues during movements of the broken limb.

Fractures are partial or complete, the former when the bone is broken only part way through; simple, when the fracture is a mere break of the bone, and compound, when the end of one or both fragments push through the skin, allowing the air with its germs to come in contact with the wound, thus greatly increasing the danger. To be sure that a bone is broken we must consider several points. The patient has usually fallen or has received a severe blow upon the part. This is not necessarily true, for old people often break the thigh bone at the hip joint by simply making a false step.

Inability to use the limb and pain first call our attention to a broken bone. Then when we examine the seat of injury we usually notice some deformity—the limb or bone is out of line, and there may be an unusual swelling. But to distinguish this condition from sprain or bruise, we must find that there is a new joint in the course of the bone where there ought not

to be any; e. g., if the leg were broken midway between the knee and ankle, we should feel that there was apparently a new joint at this place, that there was increased capacity for movement in the middle of the leg, and perhaps the ends of the fragments of bones could be heard or felt grating together.

These, then, are the absolute tests of a broken bone—unusual mobility (or capacity for movement) in the course of the bone, and grating of the broken fragments together. The last will not occur, of course, unless the fragments happen to lie so that they touch each other and should not be sought for. In the case of limbs, sudden shortening of the broken member from overlapping of the fragments is a sure sign.

SPECIAL FRACTURES.

BROKEN RIB.—*First Aid Rule.*—*Patient puts hands on head while attendant puts adhesive-plaster band, one foot wide, around injured side from spine over breastbone to line of armpit of sound side. Then put patient to bed.*

A rib is usually broken by direct violence. The symptoms are pain on taking a deep breath, or on coughing, together with a small, very tender point. The deformity is not usually great, if, indeed, any exists, so that nothing in the external appearance may call the attention to fracture. Grating between the fragments may be heard by the patient or by the ex-

Special Fractures

aminer, and the patient can often place his finger on the exact location of the break.

When it is a matter of doubt whether a rib is broken or not the treatment for broken rib should be followed for relief of pain.

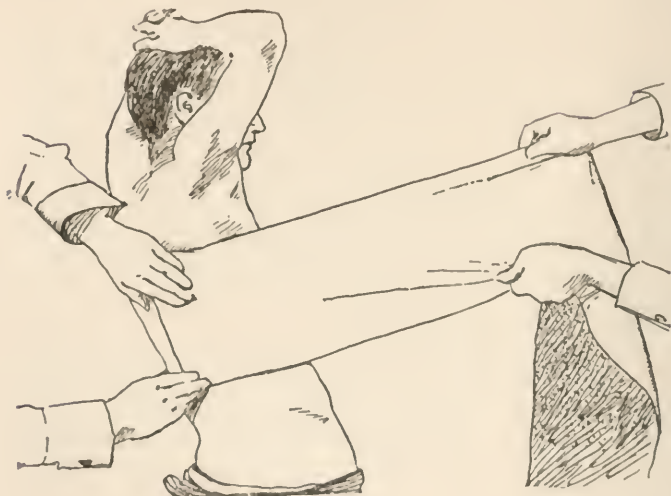


FIG. 8.

METHOD OF BANDAGING BROKEN RIB (SCUDDER).

Note manner of sticking one end of wide adhesive plaster along back-bone ; also assistant carrying strip around injured side.

Treatment consists in applying a wide band of surgeon's adhesive plaster, to be obtained at any drug shop. The band is made by overlapping strips four or five inches wide, till a width of one foot is obtained.

This is then applied by sticking one end along the back bone and carrying it forward around the injured side of the chest over the breastbone as far as a line below the armpit on the uninjured side of the chest, i. e., three-quarters way about the chest. These four- or five-inch strips of plaster may be cut the right length first and laid together, overlapping about two inches, and put on as a whole, or, what is easier, each strip may be put on separately, beginning at the spine, five inches below the fracture, and continuing to apply the strips, overlapping each other about two inches, until the band is made to extend to about five inches above the point of fracture, all the strips ending in the line of the armpit of the uninjured side. (Fig. 8.)

If surgeon's plaster cannot be obtained, a strong unbleached cotton or flannel bandage, a foot wide, should be placed all around the chest and fastened as snugly as possible with safety pins, in order to limit the motion of the chest wall. The patient will often be more comfortable sitting up, and should take care not to be exposed to cold or wet for some weeks, as pleurisy or pneumonia may follow. Three weeks are required for firm union to be established in broken ribs.

COLLAR-BONE FRACTURE.

First Aid Rule.—Put patient flat on back, on level bed, with small pillow between his shoulders; place forearm of injured side across chest, and retain it so with bandage about chest and arm.

Collar-Bone Fracture

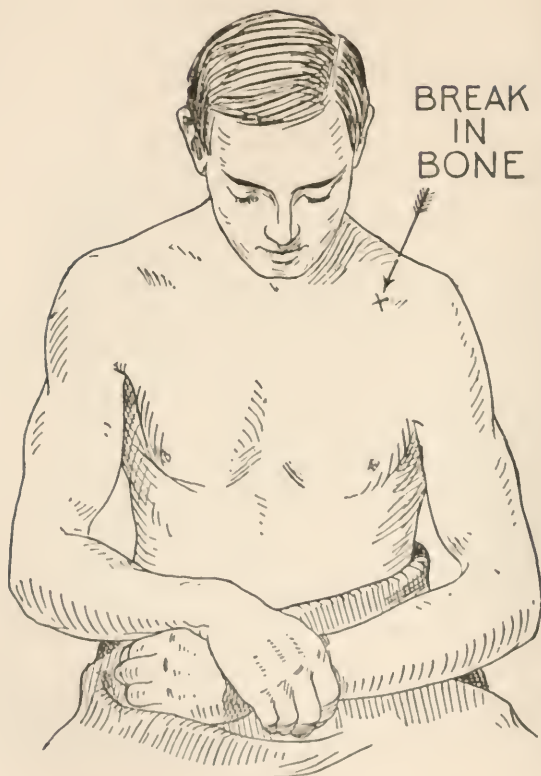


FIG. 9.

A BROKEN COLLAR BONE (SCUDDER).

Usual attitude of patient with a fracture of this kind; note lowering and narrowed appearance of left shoulder.

Fracture of the collar bone is one of the commonest accidents. The bone is usually broken in the middle third. A swelling often appears at this point, and there is pain there, especially on lifting the arm up and away from the body. It will be noticed that the shoulder, on the side of the injury, seems narrower and also lower than its fellow. The head is often bent toward the injured side, and the arm of the same side is grasped below the elbow by the other hand of the patient and supported as in a sling. (See Fig. 9.) In examining an apparently broken bone *the utmost gentleness may be used* or serious damage may result.

Treatment.—The best treatment consists in rest in bed on a hard mattress; the patient lying flat on the back with a small pillow between the shoulders and the forearm of the injured side across the chest. This is a wearisome process, as it takes from two to three weeks to secure repair of the break. On the other hand, if the forearm is carried in a sling, so as to raise and support the shoulder, while the patient walks about, a serviceable result is usually obtained; the only drawback being that an unsightly swelling remains at the seat of the break. To make a sling, a piece of strong cotton cloth a yard square should be cut diagonally from corner to corner, making two right-angled triangles. Each of these will make a properly shaped piece for a sling. (See Figs. 10 and 11.)

Fracture of the collar bone happens very often in

Collar-Bone Fracture

little children, and is commonly only a partial break or splitting of the bone, not extending wholly through the shaft so as to divide it into two fragments, but



FIG. 10.



FIG. 11.

The above illustration shows sling in position. It is made of cotton cloth a yard square cut diagonally from corner to corner.

HOW TO MAKE A SLING (SCUDDER).

In Fig. 10 note three-cornered bandage; No. 2 end is carried over right shoulder, No. 1 over left, then both fastened behind neck; No. 3 brought over and pinned.

causing little more than bending of the bone (the "green-stick fracture").

A fall from a chair or bed is sufficient to cause the accident. A child generally cries out on movement of

the arm of the injured side, or on being lifted by placing the hands under the armpits of the patient. A tender swelling is seen at the point of the injury of the collar bone. A broad cotton band, with straps over the shoulders to keep it up, should encircle the body and upper arm of the injured side, and the hand of the same side should be supported by a narrow sling fastened above behind the neck.

LOWER-JAW FRACTURE.

First Aid Rule.—Put fragments into place with your fingers, securing good line of his teeth. Support lower jaw by firmly bandaging it against upper jaw, mouth shut, using four-tailed bandage. (Fig. 12.)

Fracture of the lower jaw is caused by a direct blow. It involves the part of the jaw occupied by the lower teeth, and is more apt to occur in the middle line in front, or a short distance to one side of this point. The force causing the break usually not only breaks the bone, but also tears the gum through into the mouth, making a compound fracture. There is immediate swelling of the gum at the point of injury, and bleeding. The mouth can be opened with difficulty.

The condition of the teeth is the most important point to observe. Owing to displacement of the fragments there is a difference in the level of the teeth or line of the teeth, or both, at the place where the fracture occurs. Also one or more of the teeth are usually loos-

Lower-Jaw Fracture

ened at this point. In addition, unusual movement of the fragments may be detected as well as a grating sound on manipulation.

Treatment.—The broken fragments should be pressed into place with the fingers, and retained tem-



FIG. 12.

BANDAGE FOR A BROKEN JAW (AMERICAN TEXT-BOOK).

Above cut shows a four-tailed bandage; note method of tying; one strip supports lower jaw; the other holds it in place against upper jaw.

porarily with a four-tailed bandage, as shown in the cut. Feeding is done through a glass tube, using milk, broths, and thin gruels. A mouth wash should be em-

ployed four times daily, to keep the mouth clean and assist in healing of the gum. A convenient preparation consists of menthol, one-half grain; thymol, one-half grain; boric acid, twenty grains; water, eight ounces.

SHOULDER-BLADE FRACTURE.

First Aid Rule.—*There is no displacement. Bandage fingers, forearm, and arm of affected side, and put this arm in sling. Fasten slung arm to body with many turns of a bandage, which holds forearm against chest and arm against side.*

Shoulder-blade fracture occasions pain, swelling, and tenderness on pressure over the point of injury. On manipulating the bone a grating sound may be heard and unnatural motion detected. The treatment consists in bandaging the forearm and arm on the injured side from below upward, beginning at the wrist; slinging the forearm bent at a right angle across the front of the body, suspended by a narrow sling from the neck, and then encircling the body and arm of the injured side from shoulder to elbow with a wide bandage applied under the sling, which holds the arm snugly against the side. This bandage is prevented from slipping down by straps attached to it and carried over each shoulder.

ARM FRACTURE.

First Aid Rule.—*Pad two pieces of thin board nine by three inches with handkerchiefs. Carefully*

Arm Fracture

pull fragments of bone apart, grasping lower fragment near elbow while assistant pulls gently on upper fragment near shoulder. Put padded boards (splints) one each side of the fracture, and wind bandage about their whole length, tightly enough to keep bony fragments firm in position. Put forearm and hand in sling.

In fracture of the arm between the shoulder and elbow, swelling and shortening may give rise to deformity. Pain and abnormal motion are symptoms, while a grating sound may be detected, but manipulation of the arm for this purpose should be avoided. The surface is apt soon to become black and blue, owing to rupture of the blood vessels beneath the skin.

The hand and forearm should be bandaged from below upward to the elbow. The bone is put in place by grasping the patient's elbow and pulling directly down in line with the arm, which is held slightly away from the side of the patient, while an assistant steadies and pulls up the shoulder. Then a wedge-shaped pad, long enough to reach from the patient's armpit to his elbow (made of cotton wadding or blanketing sewed in a cotton case) and about four inches wide and three inches thick at one end, tapering up to a point at the other, is placed against the patient's side with the tapering end uppermost in the armpit and the thick end down. This pad is kept in place by a strip of surgeon's adhesive plaster, or bandage passing through

the small end of the wedge, and brought up and fastened over the shoulder.

While the arm is pulled down from the shoulder, three strips of well-padded tin or thin board (such as picture-frame backing) two inches wide and long

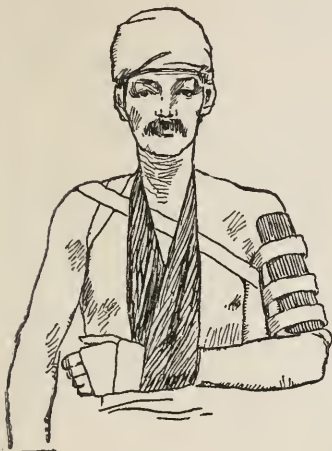


FIG. 13.



FIG. 14.

BANDAGE FOR BROKEN ARM (SCUDDER).

In Fig. 13 note splints secured by adhesive plaster; also pad in armpit; in Fig. 14 see wide bandage around body; also sling.

enough to reach from shoulder to elbow, are laid against the front, outside, and back of the arm, and secured by encircling strips of surgeon's plaster or bandage. The arm is then brought into the pad lying against the side under the armpit, and is held there firmly by a wide bandage surrounding the arm and

Forearm Fracture

entire chest, and reaching from the shoulder to elbow. It is prevented from slipping by strips of cotton cloth, which are placed over the shoulders and pinned behind and before to the top of the bandage. The wrist is then supported in a sling, not over two inches wide, with the forearm carried in a horizontal position across the front of the body. Firm union of the broken arm takes place usually in from four to six weeks. (See Figs. 13 and 14.)

FOREARM FRACTURE.

First Aid Rule.—Set bones in proper place by pulling steadily on wrist while assistant holds back the upper part of the forearm. If unsuccessful, leave it for surgeon to reduce after "period of inaction" comes, a few days later, when swelling subsides. If successful, put padded splints (pieces of cigar box padded with handkerchiefs) one on each side, front and back, and wind a bandage about whole thing to hold it immovably.

Two bones enter into the structure of the forearm. One or both of these may be broken. The fracture may be simple or compound,¹ when the soft parts are damaged and the break of the bone communicates with the air, the ends of the bone even projecting through the skin.

¹ For treatment of compound fracture, see Compound Fracture of Leg (p. 116).

In fracture of both bones there is marked deformity, caused by displacement of the broken fragments, and unusual motion may be discovered; a grating sound

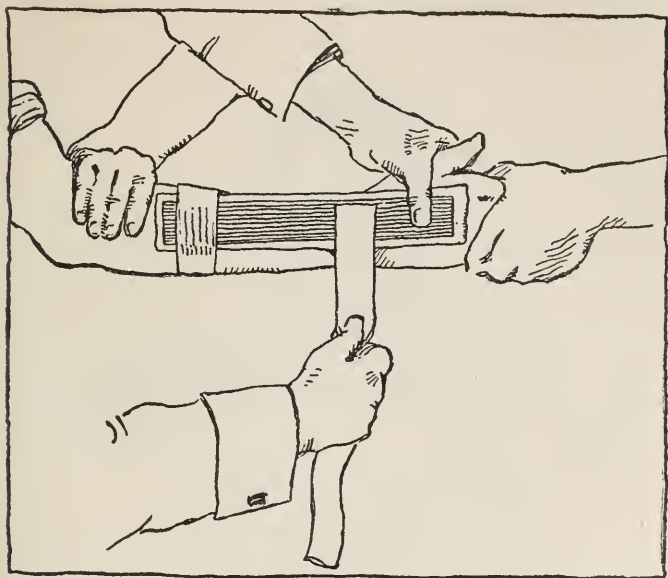


FIG. 15.

SETTING A BROKEN FOREARM (SCUDDER).

See manner of holding arm and applying adhesive plaster strips; one splint is shown, another is placed back of hand and forearm.

may also be detected but, as stated before, manipulation of the arm should be avoided.

When only one bone is broken the signs are not so marked, but there is usually a very tender point at the seat of the fracture, and an irregularity of the sur-

Forearm Fracture

face of the bone may be felt at this point. If false motion and a grating sound can also be elicited, the condition is clear. The broken bones are put into their proper place by the operator who pulls steadily on the

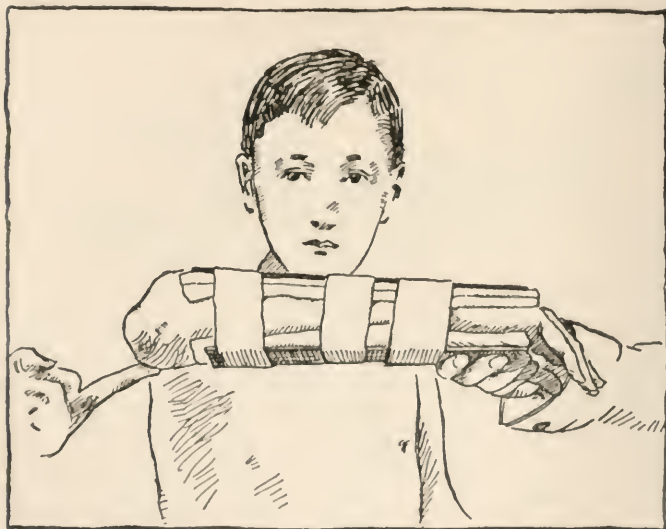


FIG. 16.

FRACTURE OF BOTH BONES IN FOREARM (SCUDDER).

This cut shows the position and length of the two padded splints; also method of applying adhesive plaster.

wrist, while an assistant grasps the upper part of the forearm and pulls the other way. The ends of the fragments are at the same time pressed into place by the other hand of the operator, so that the proper straight line of the limb is restored.

Winslow and Ferris

After the forearm is set, it should be held steadily in the following position while the splints are applied. The elbow is bent so that the forearm is held at right angles with the arm horizontally across the front of the chest with the hand extended, open palm toward the body and thumb uppermost. The splints, two in number, are made of wood about one-quarter inch thick, and one-quarter inch wider than the forearm. They should be long enough to reach from about two inches below the elbow to the root of the fingers. They are covered smoothly with cotton wadding, cotton wool, or other soft material, and then with a bandage. The splints are applied to the forearm in the positions described, one to the back of the hand and forearm, and the other to the palm of the hand and front of the forearm.

Usually there are spaces in the palm of the hand and front of the wrist requiring to be filled with extra padding in addition to that on the splint. The splints are bound together and to the forearm by three strips of surgeon's adhesive plaster or bandage, about two inches wide. One strip is wound about the upper ends of the splints, one is wrapped about them above the wrist, and the third surrounds the back of the hand and palm, binding the splints together below the thumb. The splints should be held firmly in place, but great care should be exercised to use no more force in applying the adhesive plaster or bandage than is necessary to accomplish this end, as it is easy to stop the cir-

Forearm Fracture

culatation by pressure in this part. There should be some spring felt when the splints are pressed together after their application. A bandage is to be applied over the splints and strips of plaster, beginning at the



FIG. 17.

DRESSING FOR BROKEN FOREARM (SCUDDER).

Proper position of arm in sling ; note that hand is unsupported with palm turned inward and thumb uppermost.

wrist and covering the forearm to the elbow, using the same care not to put the bandage on too firmly. The forearm is then to be held in the same position by a wide sling, as shown above. (See Figs. 15, 16, 17.)

Four weeks are required to secure firm union after this fracture. When the fracture is compound the same treatment should be employed as described under Compound Fracture of Leg, p. 116.

FRACTURE OF THE WRIST; COLLES'S FRACTURE.—This is a break of the lower end of the bone on the thumb side of the wrist, and much the larger bone in this part of the forearm. The acci-

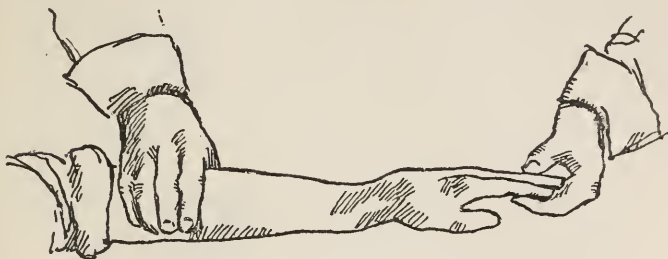


FIG. 18.

A BROKEN WRIST (SCUDDER).

Characteristic appearance of a "Colles's fracture"; note backward displacement of hand at wrist; also fork-shaped deformity.

dent happens when a person falls and strikes on the palm of the hand; it is more common in elderly people. A peculiar deformity results. A hump or swelling appears on the back of the wrist, and a deep crease is seen just above the hand in front. The whole hand is also displaced at the wrist toward the thumb side.

It is not usual to be able to detect abnormal motion in the case of this fracture, or to hear any grating sound on manipulating the part, as the ends of the



FIG. 19.



FIG. 20.



FIG. 21.



FIG. 22.

FRACTURE OF THE WRIST (SCUDDER).

Above illustrations show deformities resulting from a broken wrist; Figs. 19 and 20 the crease at base of thumb; Fig. 21 hump on back of wrist; Fig. 22 twisted appearance of hand.

fragments are generally so jammed together that it is necessary to secure a surgeon as soon as possible to pull them apart under ether, in order to remedy the existing "silver-fork" deformity. (See Figs. 18, 19, 20, 21, 22.)

Treatment.—Until medical aid can be obtained the same sort of splints should be applied, and in the same way as for the treatment of fractured forearm. If the deformity is not relieved a stiff and painful joint usually persists. It is sometimes impossible for the most skillful surgeon entirely to correct the existing deformity, and in elderly people some stiffness and pain in the wrist and fingers are often unavoidable results.

FRACTURE OF BONE OF HAND, OR FINGER.

First Aid Rule.—Set fragments of bone in place by pulling with one hand on finger, while pressing fragments into position with other hand. Put on each side of bone a splint made of cigar box, padded with folded handkerchiefs, and retain in place with bandage wound about snugly. Put forearm and hand in sling.

This accident more commonly happens to the bones corresponding to the middle and ring finger, and occurs between the knuckle and the wrist, appearing as a swelling on the back of the hand. On looking at the closed fist it will be seen that the knuckle corresponding to the broken bone in the back of the hand has ceased to be prominent, and has sunken down below

Fracture of Bone of Hand, or Finger

the level of its fellows. The end of the fragment nearer the wrist can generally be felt sticking up in the back of the hand.

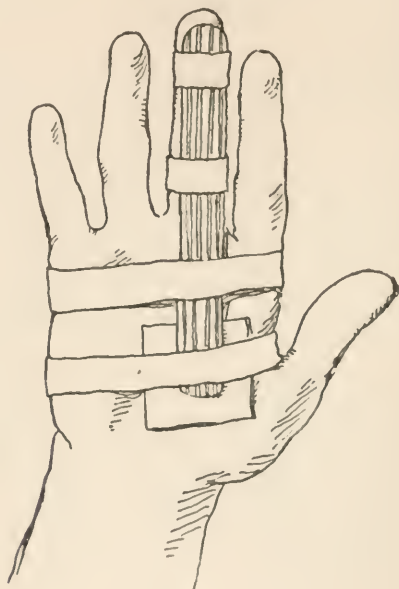


FIG. 23.

A BROKEN FINGER (SCUDDER).

Note splint extending from wrist to tip of finger; also manner of applying adhesive plaster strips and pad in palm.

If the finger corresponding to the broken bone in the back of the hand be pulled on forcibly, and the fragments be held between the thumb and forefinger of the other hand of the operator, pain and abnormal mo-

tion may be detected, and the ends of the broken bone pressed into place. A thin wooden splint, as a piece of cigar box, about an inch wide at base and tapering to the width of the finger should be applied to the palm of the hand extending from the wrist to a little beyond the finger tip, secured by strips of adhesive plaster, as in the cut, and covered by a bandage. The splint should be well padded, and an additional pad should be placed in the palm of the hand over the point of fracture. Three weeks are required for firm union, and the hand should not be used for a month.

It is usually easy to recognize a broken bone in a finger, unless the break is near a joint, when it may be mistaken for a dislocation. Pain, abnormal motion, and grating between the fragments are observed.

If there is deformity, it may be corrected by pulling on the injured finger with one hand, while with the other the fragments are pressed into line. A narrow, padded wooden or tin splint is applied, as in the cut (p. 102), reaching from the middle of the palm to the finger tip. Any existing displacement of the broken bone can be relieved by using pressure with little pads of cotton held in place by narrow strips of adhesive plaster where it is needed to keep the bone in line. The splint may be removed in two weeks and a strip of adhesive plaster wound about the finger to support it for a week or two more.

In fracture of the thumb, the splint is applied along the back instead of on the palm side.

Hip Fracture

HIP FRACTURE.

First Aid Rule.—Put patient flat on back in bed, with limb wedged between pillows till surgeon arrives.

A fracture of the hip is really a break of that portion of the thigh bone which enters into the socket of the pelvic bone and forms the hip joint. It occurs most commonly in aged people as a result of so slight



FIG. 24.

TREATING A BROKEN HIP (SCUDDER).

Note the manner of straightening leg and getting broken bone into line; also assistant carefully steadying the thigh.

an accident as tripping on a rug, or in falling on the floor from the standing position, making a misstep, or while attempting to avoid a fall. When the accident has occurred the patient is unable to rise or walk, and suffers pain in the hip joint. When he has been helped to bed it will be seen that the foot of the injured side is turned out, and the leg is perhaps apparently shorter than its fellow. There is pain on movement of the limb,

and the patient cannot raise his heel, on the injured side, from the bed. Shortening is an important sign.

With the patient lying flat on the back and both legs together in a straight line with the body, measurements from each hip-bone are made with a tape to the bony prominence on the inside of each ankle, in turn. One end of the tape is held at the navel and the other is swung from one ankle to the other, comparing the length of the two limbs. Shortening of less



FIG. 25.

TREATMENT FOR FRACTURED HIP (SCUDDER).

Note method of holding splints in place with muslin strips ; one above ankle, one below and one above knee, one in middle and one around upper part of thigh.

than half an inch is of no importance as a sign of fracture. The fragments of broken bone are often jammed together (impacted) so that it is impossible to get any sound of grating between them, and it is very unwise to manipulate the leg or hip joint, except in the gentlest manner, in an attempt to get this grating. If the ends of the fragments become disengaged from each other it often happens that union of the break never occurs.

The treatment simply consists in keeping the pa-

Thigh-Bone Fracture

tient quiet on a hard mattress, with a small pillow under the knee of the injured side and the limb steadied on either side by pillows or cushions until a surgeon can be obtained. (See Thigh-bone Fracture.)

THIGH-BONE FRACTURE.

First Aid Rule.—Prepare long piece of thin board which will reach from armpit to ankle, and another piece long enough to reach from crotch to knee, and pad each with folded towels or blanket.

While one assistant holds body back, and another assistant pulls on ankle of injured side, see that the fragments are separated and brought into good line, and then apply the splints, assistants still pulling steadily, and fasten the splints in place with bandage, or by tying several cloths across at three places above the knee and two places below the knee.

Finally, pass a wide band of cloth about the body, from armpit to hips, inclosing the upper part of the well-padded splint, and fasten it snugly. The hollow between splint and waist must be filled with padding before this wide cloth is applied.

In fracture of the thigh bone (between the hip and knee), there is often great swelling about the break. The limb is helpless and useless. There is intense pain and abnormal position in the injured part, besides deformity produced by the swelling. The foot of the injured limb is turned over to one side or the other,

owing to a rolling over of the portion of the limb below the break. With both lower limbs in line with the body, and the patient lying on the back, measurements are made from each hip-bone to the prominence on the inside of either ankle joint. Shortening of the injured leg will be found, varying from one to over two inches, according to the overlapping and displacement of the fragments.

Treatment.—To set this fracture temporarily, a board about five inches wide and long enough to reach from the armpit to the foot should be padded well with towels, sheets, shawls, coats, blanket, or whatever is at hand, and the padding can best be kept in place by surgeon's adhesive plaster, bicycle tape, or strips of cloth.¹ Another splint should be provided as wide as the thigh and long enough to reach along the back of the leg from the middle of the calf to the buttock, and also padded in the same way. A third splint should be prepared in the same manner to go inside the leg, reaching from the crotch to the inside of the foot. Still a fourth splint made of a thin board as wide as the thigh, extending from the upper part of the thigh to just above the knee, is padded for application to the front of the thigh.

When these are made ready and at hand, the leg should be pulled on steadily but carefully straight away from the body to relax the muscles, an assistant hold-

¹ This method follows closely that recommended by Scudder, in his book "The Treatment of Fractures."

Thigh-Bone Fracture

ing the upper part of the thigh and pulling in the opposite direction. Then, when the leg has been straightened out and the thigh bone seems in fair line, the splints should be applied; the first to the outside of the thigh and body, the second under the calf, knee, and thigh; the third to the inside of the whole limb, and the fourth to the front of the thigh.

Wide pads should be placed over the ribs under the outside splint to fill the space above the hips and under the armpit. Then all four splints are drawn together and held in place by rubber-plaster straps or strips of strong muslin applied as follows: one above the ankle; one below the knee; one above the knee; one in the middle of the thigh, and one around the upper part of the thigh. A wide band of strong muslin or sheeting should then be bound around the whole body between the armpits and hips, inclosing the upper part of the outside splint. The patient can then be borne comfortably upon a stretcher made of boards and a mattress or some improvised cushion. (See Figs. 24 and 25.)

When the patient can be put immediately to bed after the injury, and does not have to be transported, it is only necessary to apply the outer, back, and front splints, omitting the inner splint. It is necessary for the proper and permanent setting of a fractured thigh that a surgeon give an anæsthetic and apply the splints while the muscles are completely relaxed. It is also essential that the muscles be kept from contracting

thereafter by the application of a fifteen- or twenty-pound weight to the leg, after the splints are applied, but it is possible to outline here only the proper first-aid treatment.

KNEEPAN FRACTURE.

First Aid Rule.—Pain is immediate and intense. Separated fragments may be felt at first. Swelling prompt and enormous. Even if not sure, follow these directions for safety.

Prepare splint: thin board, four inches wide, and long enough to reach from upper part of thigh to just above ankle. Pad with folded piece of blanket or soft towels. Place it behind leg and thigh; carefully fill space behind knee with pad; fasten splint to limb with three strips of broad adhesive plaster, one around upper end of splint, one around lower end, one just below knee.

Lay large flat, dry sponge over knee thus held, and bandage this in place. Keep sponge and bandage wet with ice water. If no sponge is available, half fill rubber hot-water bottle with cracked ice, and lay this over knee joint. Put patient to bed.

Fracture of kneepan is caused either by direct violence or muscular strain. It more frequently occurs in young adults. Immediate pain is felt in the knee and walking becomes impossible; in fact, often the patient cannot rise from the ground after the acci-

Kneepan Fracture

dent. Swelling at first is slight, but increases enormously within a few hours. Immediately after the injury it may be possible to feel the separate broken fragments of the kneepan and to recognize that they are separated by a considerable space if the break is horizontally across the bone.

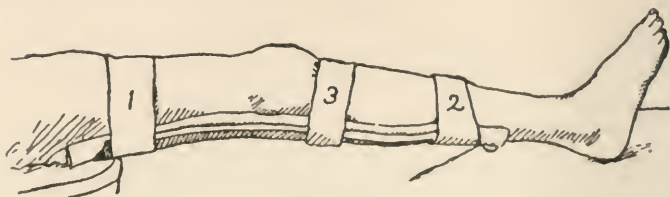


FIG. 26.

A BROKEN KNEEPAN (SCUDDER).

A padded splint, supporting knee, is shown reaching from ankle to thigh. Note number and location of adhesive plaster strips.

Nothing can be done to set the fracture until the swelling about the joint has been reduced, so that the first treatment consists in securing immediate rest for the kneejoint, and immobility of the fragments. A splint made of board, about a quarter of an inch thick and about four inches wide for an adult, reaching from the upper part of the thigh above to a little above the ankle below, is applied to the back of the limb and well padded, especially to fill the space behind the knee. The splint is attached to the limb by straps of adhesive plaster two inches and a half wide; one around the lower end of the splint, one around the upper part, and the third placed just below the knee. To prevent and

arrest the swelling and pain, pressure is then made on the knee by bandaging.

One of the best methods (Scudder's) is to bind a large, flat, dry sponge over the knee and then keep it wet with cold water; or to apply an ice bag directly to the swollen knee; a splint in either case being the first requisite. The patient should of course be put to bed as soon as possible after the accident, and should lie on the back with the injured leg elevated on a pillow with a cradle to keep the clothes from pressing on the injured limb. (See cut, p. 110.)

FRACTURE OF LEG BONES, BETWEEN KNEE AND ANKLE.

First Aid Rule.—*Handle very carefully; great danger of making opening to surface. Special painful point, angle or new joint in bone, disability, and grating felt will decide existence of break. Let assistant pull on foot, to separate fragments, while you examine part of supposed break. If only one bone is broken, there may be no displacement.*

Put patient on back. While two assistants pull, one on ankle and one on thigh at knee, thus separating fragments, slide pillow lengthwise under knee, and, bringing its edges up about leg, pin them snugly above leg.

Prepare three pieces of thin wood, four inches wide and long enough to reach from sole of foot to a point four inches above knee. While assistants pull on limb

Fracture of Leg Bones

again, as before, put one splint each side and third behind limb, and with bandage or strips of sticking plaster fasten these splints to the leg inclosed in its pillow as tight as possible.

In fracture of the leg between the knee and ankle we have pain, angular deformity or an apparent false joint in the leg, swelling and tenderness over the seat of fracture, together with inability to use the injured leg. Two bones form the framework of the leg; the inner,



FIG. 27.

FRACTURE OF BOTH LEG BONES (SCUDDER).

This cut shows the peculiar deformity in breaks of this kind; see position of kneepan; also prominence of broken bone above ankle.

or shinbone, the sharp edge of which can be felt in front throughout most of its course, being much the larger and stronger bone. When both bones are broken, the displacement of the fragments, abnormal motion and consequent deformity, are commonly apparent, and a grating sound may be heard, but should not be sought for.

An open wound often communicates with the break, making the fracture compound, a much more serious condition. To avoid making the fracture a compound

one, during examination of the leg, owing to the sharp ends of the bony fragments, the utmost gentleness should be used. Under no circumstances attempt to move the fragments from side to side, or backward and forward, in an effort to detect the grating sound often caused by the ends of broken bones. The greatest danger lies in the desire to do too much. We again refer the reader to First Aid Rule I.

When one bone is broken there may be only a point of tenderness and swelling about the vicinity of the break and no displacement or grating sound.

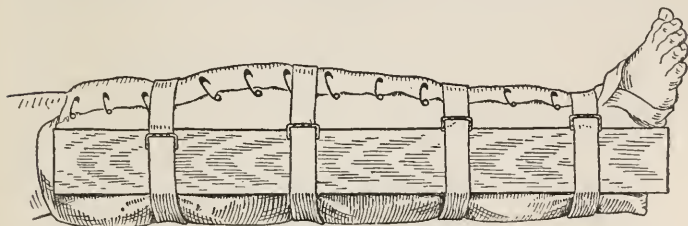


FIG. 28.

BANDAGE FOR BROKEN LEG (SCUDDER).

Note the pillow brought up around leg and edges pinned together; also length and method of fastening splint with straps.

When in doubt as to the existence of a fracture always treat the limb as if a fracture were present. "Black-and-blue" discoloration of the skin much more extensive than that following sprain will become evident over the whole leg within twenty-four hours.

Treatment.—When a surgeon cannot be obtained,

Fracture of Leg Bones

the following temporary pillowdressing, recommended by Scudder in his book on fractures, is one of the best. With the patient on his back, the leg having been straightened and any deformity removed as far as possible by grasping the foot and pulling directly away from the body while an assistant steadies the thigh, a large, soft pillow, inclosed in a pillowcase, is placed under the leg. The sides of the pillow are brought well up about the leg and the edges of the pillowcase are pinned together along the front of the leg.

Then three strips of wood about four inches wide, three-sixteenths to a quarter of an inch thick, and long enough to reach from the sole of the foot to about four inches above the knee, are placed outside of the pillow along the inner and outer aspects of the leg and beneath it. The splints are held in place, with the pillow as padding beneath, by four straps of webbing (or if these cannot be obtained, by strips of stout cloth, adhesive plaster, or even rope); but four pads made of folded towels should be put under the straps where they cross the front of the leg where little but the pillowcase overlaps. These straps are applied thus: one above the knee, one above the ankle, and the other two between these two points, holding all firmly together. This dressing may be left undisturbed for a week or even ten days if necessary. (See Figs. 27 and 28.)

The leg should be kept elevated after the splints are applied, and steadied by pillows placed either side

of it. From one to two months are required to secure union in a broken leg in adults, and from three to five months elapse before the limb is completely serviceable. In children the time requisite for a cure is usually much shorter.

ANKLE-JOINT FRACTURE.

First Aid Rule.—One or both bones of leg may be broken just above ankle. Foot is generally pushed or bent outward. Prepare two pieces of thin wood, four inches wide and long enough to go from sole of foot to just below knee:—the splints. Pad them with folded towels or pieces of blanket.

While assistants pull bones apart gently, one pulling on knee, other pulling on foot and turning it straight, apply the splints, one each side of the leg.

A fracture of the ankle joint is really a fracture of the lower extremities of the bones of the leg. There are present pain and great swelling, particularly on the inner side of the ankle at first, and the whole foot is pushed and bent outward. The bony prominence on the inner side of the ankle is unduly marked. The foot besides being bent outward is also displaced backward on the leg. This fracture might be taken for a dislocation or sprain of the ankle. Dislocation of the ankle without fracture is very rare, and when the foot is returned to its proper position it will stay there, while in fracture the foot drops back to its former displaced

Compound or Open Fracture of the Leg

state. In sprained ankle there are pain and swelling, but not the deformity caused by the displacement of the foot.

This fracture may be treated temporarily by returning the foot to its usual position and putting on side splints and a back splint, as described for the treatment of fracture of the leg.

COMPOUND OR OPEN FRACTURE OF THE LEG.—This condition may be produced either by the violence which caused the fracture also leading to destruction of the skin and soft parts beneath, or by the end of a bony fragment piercing the muscles and skin from within. In either event the result is much more serious than that of an ordinary simple fracture, for germs can gain entrance through the wound in the skin and cause inflammation with partial destruction or death of the part.

Treatment.—Immediate treatment is here of the utmost value. It is applicable to open or compound fracture in any part of the body. The area for a considerable distance about the wound, if covered with hair, should be shaved. It should then be washed with warm water and soap by means of a clean piece of cotton cloth or absorbent cotton. Then some absorbent cotton or cotton cloth should be boiled in water in a clean vessel for a few minutes, and, after the operator has thoroughly washed his hands, the boiled water (when sufficiently cool) should be applied to the wounded area and surrounding parts with the boiled

cotton, removing in the most painstaking way all visible and invisible dirt. By allowing some of the water to flow over the wound from the height of a few feet this result is favored. Finally some of the boiled cotton, which has not been previously touched, is spread over the wound wet, and covered with clean, dry cotton and bandaged.

Splints are then applied as for simple fracture in the same locality (p. 113). If a fragment of bone projects through the wound it may be replaced after the cleansing just described, by grasping the lower part of the limb and pulling in a straight line of the limb away from the body, while an assistant holds firmly the upper part of the limb and pulls in the opposite direction. During the whole process neither the hands of the operator nor the boiled cotton should come in contact with anything except the vessel containing the boiled water and the patient.

CHAPTER. V

Dislocations

How to Tell a Dislocation—Reducing a Dislocated Jaw—Stimson's Method of Treating a Dislocated Shoulder—Appearance of Elbow when Out of Joint—Hip Dislocations—Forms of Bandages.

DISLOCATIONS; BONES OUT OF JOINT.

JAW.—Rare. Mouth remains open, lower teeth advanced forward.

First Aid Rule 1.—Protect your thumbs. Put on thick leather gloves, or bind them with thick bandage.

Rule 2.—Assistant steadies patient from behind, with hands both sides of his head, operator presses downward and backward with his thumbs on back teeth of patient, each side of patient's jaw, while the chin is grasped between forefingers and raised upward. Idea is to stretch the ligament at jaw joint, and swing jaw back while pulling on this ligament. (Fig. 29.)

Rule 3.—Tie jaw with four-tailed bandage up against upper jaw for a week. (Fig. 12, p. 90.)

SHOULDER.—Common accident. No hurry. See p. 122.

ELBOW.—Rare. No hurry. See p. 125.

HIP.—No hurry. See p. 129.

KNEE.—Rare. Easily reduced. Head of lower bone (tibia) is moved to one side; knee slightly bent.

First Aid Rule 1.—*Put patient on back.*

Rule 2.—*Flex thigh on abdomen and hold it there.*

Rule 3.—*Grasp leg below knee and twist it back and forth, and straighten knee.*

DISLOCATIONS.—A dislocation is an injury to a joint wherein the ends of the bones forming a joint are forced out of place. A dislocation is commonly described as a condition in which a part (as the shoulder) is “out of joint” or “out of place.” A dislocation must be distinguished from a sprain, and from a fracture near a joint. In a sprain, as has been stated (p. 65), the bones entering into the formation of the joint are perhaps momentarily displaced, but return into their proper place when the violence is removed. But, owing to greater injury, in dislocation the head of the bone slips out of the socket which should hold it, breaks through the ligaments surrounding the joint, and remains permanently out of place. For this reason there is a peculiar deformity, produced by the head of the bone’s lying in its new and unnatural situation, which is not seen in a sprain.

Also, the dislocated joint cannot be moved by the patient or by another person, except within narrow limits, while a sprained joint can be moved, with the production of pain it is true, but without any mechan-

Dislocation of the Jaw

ical obstacle. In the case of fracture near a joint there is usually increased movement in some new direction. When a dislocated joint is put in proper place it stays in place, whereas when a fractured part is reduced there is nothing to keep it in place and, if let alone, it quickly resumes its former faulty position.

Only a few of the commoner dislocations will be considered here, as the others are of rare occurrence and require more skill than can be imparted in a book intended for the laity. The following instructions are not to be followed if skilled surgical attendance can be secured; they are intended solely for those not so fortunately situated.

DISLOCATION OF THE JAW.—This condition is caused by a blow on the chin, or occurs in gaping or when the mouth is kept widely open during prolonged dental operations. The joint surface at the upper part of the lower jaw, just in front of the entrance to the ear, is thrown out of its socket on one side of the face, or on both sides. If the jaw is put out of place on both sides at once, the chin will be found projecting so that lower front teeth jut out beyond the upper front teeth, the mouth is open and cannot be closed, and the patient is suffering considerable pain. When the jaw is dislocated on one side only, the chin is pushed over toward the uninjured side of the face, which gives the face a twisted appearance; the mouth is partly open and fixed in that position. A depression is seen on the injured side in front of the

ear, while a corresponding prominence exists on the opposite side of the face, and the lower front teeth project beyond the upper front teeth.



FIG. 29.

REDUCING DISLOCATION OF JAW (AMERICAN TEXT-BOOK).

Thumbs placed upon last molar teeth on each side; note jaw grasped between fingers and thumbs to force it into place.

Treatment.—A dislocation of one side of the jaw is treated in the same manner as that of both sides.

The dislocation may sometimes be reduced by

Dislocation of the Shoulder

placing a good-sized cork as far back as possible between the back teeth of the upper and lower jaws (on one or both sides, according as the jaw is out of place on one or both sides), and getting the patient to bite down on the cork. This may pry the jaw back into place.

The common method is for the operator to protect both thumbs by wrapping bandage about his thumbs, or wearing leather gloves, and then, while an assistant steadies the head, the operator presses downward and backward on the back teeth of the patient on each side of the lower jaw with both thumbs in the patient's mouth, while the chin is grasped beneath by the forefingers of each hand and raised upward. When the jaw slips into place it should be maintained there by a bandage placed around the head under the chin and retained there for a week. During this time the patient should be fed on liquids through a tube, so that it will not be necessary for him to open his mouth to any extent. (See Fig. 29.)

DISLOCATION OF THE SHOULDER.—This is by far the most common of dislocations in adults, constituting over one-half of all such accidents affecting any of the joints. It is caused by a fall or blow on the upper arm or shoulder, or by falling upon the elbow or outstretched hand. The upper part (or head) of the bone of the arm (humerus) slips downward out of the socket or, in some cases, inward and forward. In either case the general appearance and treat-

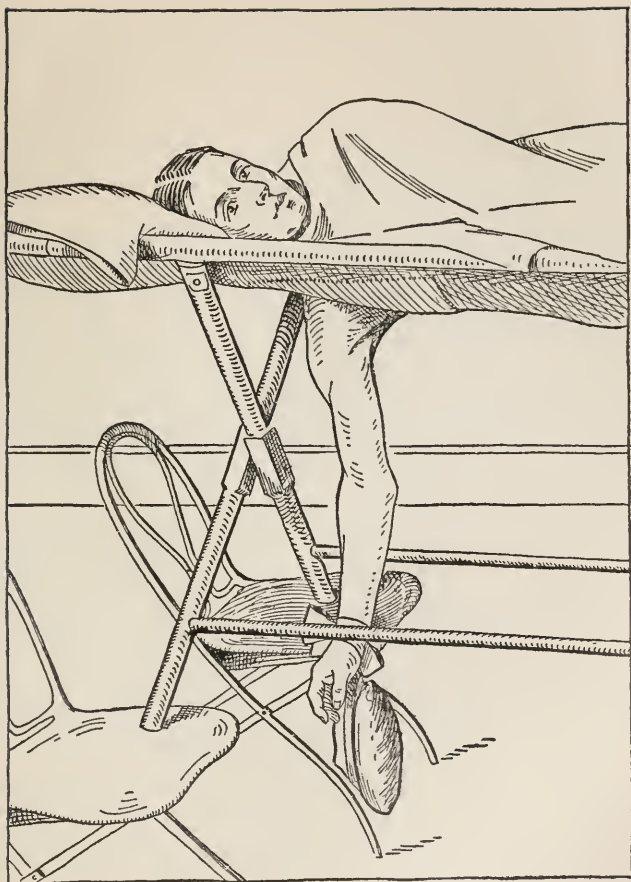


FIG. 30.

TREATING A DISLOCATED SHOULDER.
(REFERENCE HANDBOOK.)

Patient lying on injured side; note arm hanging through hole in cot raised from floor on chairs; also weight attached to wrist.

Dislocation of the Shoulder

ment of the accident are much the same. The shoulder of the injured side loses its fullness and looks flatter in front and on the side. The arm is held with the elbow a few inches away from the side, and the line of the arm is seen to slope inwardly toward the shoulder, as compared with the sound arm.

The injured arm cannot be moved much by the patient, although it can be lifted up and away from the side by another person, but cannot be moved so that, with the elbow against the front of the chest, the hand of the injured arm can be laid on the opposite shoulder. Neither can the arm, with the elbow at a right angle, be made to touch the side with the elbow, without causing great pain.

Treatment.—One of the simplest methods (Stimson's) of reducing this dislocation consists in placing the patient on his injured side on a canvas cot, which should be raised high enough from the floor on chairs, and allowing the injured arm to hang directly downward toward the floor through a hole cut in the cot, the hand not touching the floor. Then a ten-pound weight is attached to the wrist. The gradual pull produced by this means generally brings the shoulder back into place without pain and within six minutes. (Fig. 30.)

The more ordinary method consists in putting the patient on his back on the floor, the operator also sitting on the floor with his stockinged foot against the patient's side under the armpit of the injured shoulder and grasping the injured arm at the elbow, he pulls

the arm directly outward (i. e., with the arm at right angles with the body) and away from the trunk. An assistant may at the same time aid by lifting the head of the arm bone upward with his fingers in the patient's armpit and his thumbs over the injured shoulder.

If the arm does not go into place easily by one of these methods it is unwise to continue making further attempts. Also if the shoulder has been dislocated several days, or if the patient is very muscular, it will generally be necessary that a surgeon give ether in order to reduce the dislocation. It is entirely possible for a skillful surgeon to secure reduction of a dislocation of the shoulder several weeks after its occurrence. After the dislocation has been relieved the arm, above the elbow, should be bandaged to the side of the chest and the hand of the injured side carried in a sling for ten days.

DISLOCATION OF THE ELBOW.—This is more frequent in children, and is usually produced by a fall on the outstretched hand. The elbow is thrown out of joint, so that the forearm is displaced backward on the arm, in the more usual form of dislocation. The elbow joint is swollen and generally held slightly bent, but cannot be moved to any extent without great pain. The tip of the elbow projects at the back of the joint more than usual, while at the front of the arm the distance between the wrist and the bend of the elbow is less than that of the sound arm. (See cut, p. 126.)

Dislocation of the Elbow

For further proof that the elbow is out of joint we must compare the relations of three points in each elbow. These are the two bony prominences on each



FIG. 31.

Above cut shows characteristic appearance of a dislocated shoulder; note loss of fullness; also elbow held away from side and inward sloping of arm.



FIG. 32.

DISLOCATED ELBOW AND SHOULDER. (AMERICAN TEXT-BOOK.)

Fig. 32 shows dislocation of elbow backward; note swollen condition of left elbow held slightly bent; also the projection of back of joint.

side of the joint (belonging to the bone of the arm above the elbow) and the bony prominence that forms the tip of the elbow which belongs to the bone of the forearm.

In dislocation backward of the forearm, the tip of the elbow is observed to be farther back, in relation to the two bony prominences at the side of the joint, than is the case in the sound elbow. This is

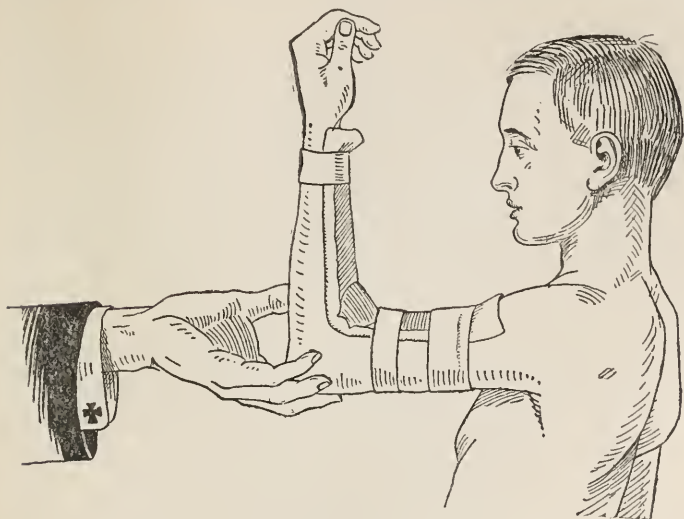


FIG. 33.

TREATMENT OF DISLOCATED ELBOW (SCUDDER).

Note padded right-angled tin splint; also three strips of surgeon's plaster on arm and forearm.

best ascertained by touching the three points on the patient's elbow of each arm in turn with the thumb and middle finger on each of the prominences on the side of the joint, while the forefinger is placed on the tip of the elbow. The lower end of the bone of the upper

Dislocation of the Elbow

arm is often seen and felt very easily just above the bend of the elbow in front, as it is thrown forward (see Fig. 32, p. 126).

Fracture of the lower part of the bone of the arm above the elbow joint may present much the same appearance as the dislocation we are describing, but then the whole elbow is displaced backward, and the relation of the three points described above is the same in the injured as in the uninjured arm. Moreover in fracture the deformity, when relieved, will immediately recur when the arm is released, as there is nothing to hold the bones in place; but in dislocation, after the bones are replaced in their normal position, the deformity will not reappear.

Treatment.—The treatment for dislocation consists in bending the forearm backward to a straight line, or even a little more, and then while an assistant holds firmly the arm above the elbow, the forearm should be grasped below the elbow and pulled with great force away from the assistant and, while exerting this traction, the elbow is suddenly bent forward to a right angle, when the bones should slip into place.

The after treatment is much the same as for most fractures of the elbow. The arm is retained in a well-padded right-angled tin splint which is applied with three strips of surgeon's plaster and bandage to the front of the arm and forearm (see Fig. 33) for two or three weeks. The splint should be removed every few days, and the elbow joint should be moved to and

fro gently to prevent stiffness, and the splint then re-applied.

DISLOCATION OF THE HIP.—This occurs more commonly in males from fifteen to forty-five years of age, and is due to external violence. In the more ordinary form of hip dislocation the patient stands on the sound leg with the body bent forward, the injured leg being greatly shortened, with the toes turned inward so much that the foot of the injured limb crosses over the instep of the sound foot. The injured limb cannot be moved outward and but slightly inward, yet may be bent forward. Walking is impossible. Pain and deformity of the hip joint are evident.

The only condition with which this would be likely to be confused is a fracture of bone in the region of the hip. Fracture of the hip is common in old people, but not in youth or middle adult life. In fracture there is usually not enough shortening to be perceived with the eye; the toes are more often turned out, and the patient can often bear some weight on the limb and even walk.

Treatment.—The simplest treatment is that recommended by Stimson, as follows: the patient is to be slung up in the air in a vertical position by means of a sheet or belt of some sort placed around the body under the armpits, so that the feet dangle a foot or so from the floor, and then a weight of about ten or fifteen pounds, according to the strength of the pa-

Dislocation of the Hip

tient's muscles, is attached to the foot of the injured leg (bricks, flatirons, or stones may be used), and



FIG. 34.

REDUCING DISLOCATION OF HIP (REFERENCE HANDBOOK).

Patient lying on table; uninjured leg held by assistant; leg of dislocated side at right angles; note weight at bend of knee.

this weight will usually draw the bone down into its socket within ten or fifteen minutes.

Or the patient may assume the position shown in the accompanying cut, lying prone upon a table with the uninjured leg held horizontally by one person, while another, with the injured thigh held vertically and leg at right angles, grasps the patient's ankle and moves it gently from side to side after placing a five-to ten-pound sand bag, or similar weight of other substance, at the flexure of the knee. When the dislocation has been overcome the patient should stay in bed for a week or two and then go about gradually on crutches for two weeks longer.

SURGICAL DRESSINGS.—Sterilized gauze is the chief surgical dressing of the present day. This material is simply cheese cloth, from which grease and dirt have been removed by boiling in some alkaline preparation, usually washing soda, and rinsing in pure water. The gauze is sterilized by subjecting it to moist or dry heat. Sterilized gauze may be bought at shops dealing in surgeons' supplies and instruments, and at most drug stores. Gauze or cheese cloth may be sterilized (to destroy germs) by baking in a slow oven, in tin boxes, or wrapped in cotton cloth, until it begins to turn brown. It is well to have a small piece of the gauze in a separate package, which may be inspected from time to time in order to see how the baking is progressing, as the material to be employed for surgical purposes should not be opened until just before it is to be used, any remainder being immediately covered again. Cut the gauze into pieces as large as the hand,

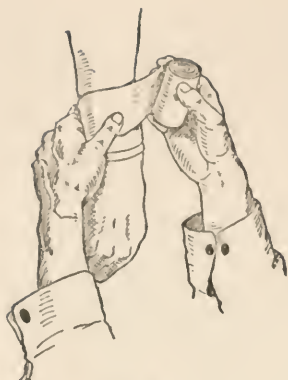


Fig. I.

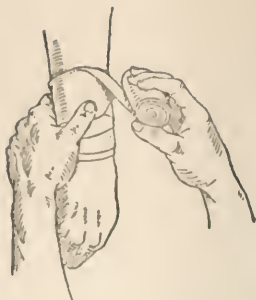


Fig. II.

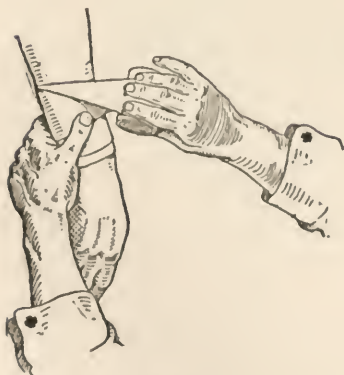


Fig. III.

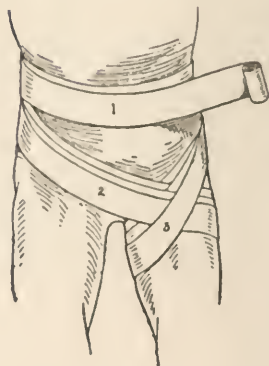


Fig. IV.

PLATE I.

APPLYING A ROLLER BANDAGE (REFERENCE HANDBOOK).

Fig. I shows method of starting a spiral bandage ; Fig. II, ready to reverse ; Fig. III, the reverse completed ; Fig. IV shows spica bandage applied to groin.

before it is sterilized, to avoid cutting and handling afterwards. Gauze may also be sterilized by steaming in an Arnold sterilizer, such as is used for milk, or by boiling, if it is to be applied wet. Carbolized, borated, and corrosive-sublimate gauze have little special value.

Absorbent cotton is also employed as a surgical dressing, and should also be sterilized if it is to be used on raw surfaces. It is not so useful for dressing wounds as gauze, since it mats down closely, does not absorb secretions and discharges so well, and sticks to the parts. When torn into balls as large as an egg and boiled for fifteen minutes in water, it is useful as sponges for cleaning wounds. Sheet wadding, or cotton, is serviceable in covering splints before they are applied to the skin. Wet antiseptic surgical dressings are valuable in treating wounds which are inflamed and not healing well. They are made by soaking gauze in solutions of carbolic acid (half a teaspoonful of the acid to one pint of hot water), and, after application, covering the gauze with oil silk, rubber dam, or paraffin paper. Heavy brown wrapping paper, well oiled or greased, will answer the purpose when better material is not at hand.

BANDAGES.—Bandaging is an art that can only be acquired in any degree of perfection by practical instruction and experience. Some useful hints, however, may be given to the inexperienced. Cotton cloth, bleached or unbleached, is commonly employed for bandages; also gauze, which does not make so effective a

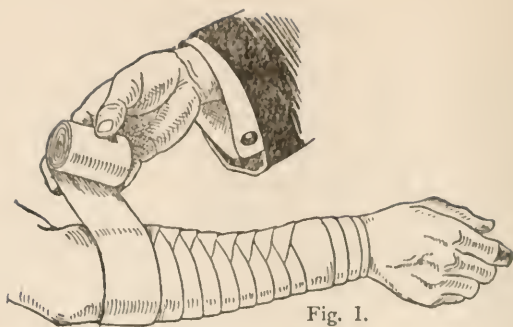


Fig. I.

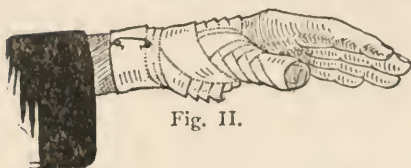


Fig. II.

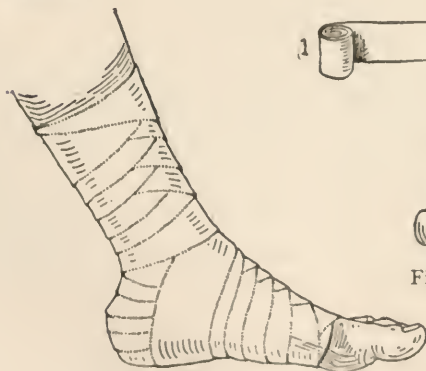


Fig. III.

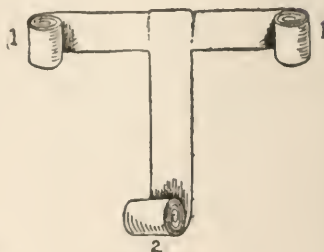


Fig. IV.

PLATE II.

DIFFERENT FORMS OF BANDAGES.

(AMERICAN TEXT-BOOK AND REFERENCE HANDBOOK.)

Fig. I shows application of figure-of-eight bandage; Fig. II, a spica bandage of thumb; Fig. III, a spica bandage of foot; Fig. IV, a T-bandage.

dressings, but is much easier of application, is softer and more comfortable, and is best adapted to the use of the novice. A bandage cannot be put on properly unless it is first rolled. A bandage for the limbs should be about two and a half inches wide and eight yards long; for the fingers, three-quarters of an inch wide and three yards long. The bandage may be rolled on itself till it is as large as the finger, and then rolled down the front of the thigh, with the palm of the right hand, while the loose end is held taut in the left hand.

Two forms of bandages are adapted to the limbs, the figure-of-eight, and the spiral reversed bandage. In applying a bandage always begin at the lower extremity of the limb and approach the body. Make a few circular turns about the limb (see Fig. I, p. 132), then as the limb enlarges, draw the bandage up spirally, reversing it each time it encircles the limb, as shown in Fig. I, p. 134. In reversing, hold the bandage with the left thumb so that it will not slip, and then allowing the free end to fall slack, turn down as in Fig. II, p. 132.

The T-bandage is used to bandage the crotch between the thighs, or around the forehead and over the top of the skull. (See Fig. IV, p. 134.) In the former case, the ends 1-1 are put about the body as a belt, and the end 2 is brought from behind, in the narrow part of the back, down forward between the thighs, over the crotch, and up to the belt in the lower part of the belly. The figure-of-eight bandage is used on various parts, and is illustrated in the bandage called *spica* of the

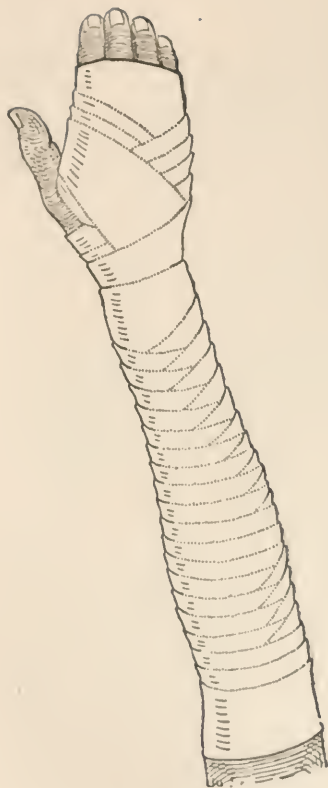


Fig. I.

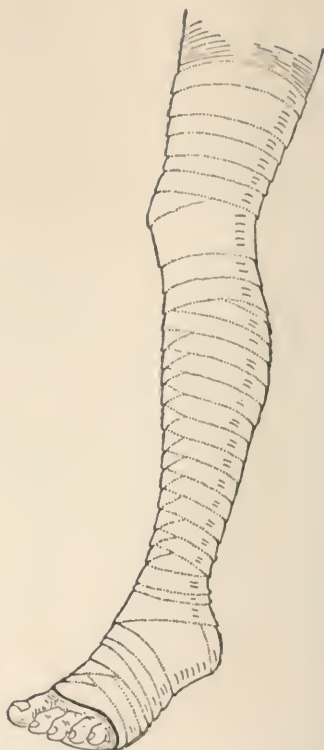


Fig. II.

PLATE III.

BANDAGES FOR EXTREMITIES (AMERICAN TEXT-BOOK).

Fig. I shows a spiral reversed bandage of arm and hand, requiring roller $2\frac{1}{2}$ inches wide and 7 yards long; Fig. II shows a spiral reversed bandage of leg and foot, requiring roller $2\frac{1}{2}$ inches wide and 14 yards long.



Fig. I.



Fig. II.



Fig. III.

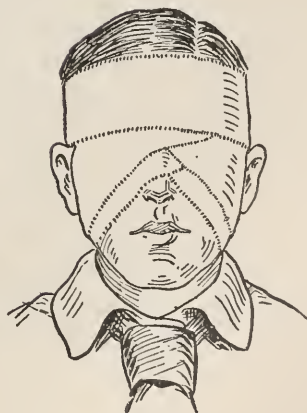


Fig. IV.

PLATE IV.

BANDAGES FOR HEAD AND HAND.

(AMERICAN TEXT-BOOK.)

Fig. I shows a gauntlet bandage; Fig. II, a circular bandage for the jaw; Fig. III, a circular bandage for the head; Fig. IV, a figure-of-eight bandage for both eyes.

groin, Fig. IV, p. 132. Beginning with a few circular turns about the body in the direction of 1, the bandage is brought down in front of the body and groin, as in 2, and then about the back of the thigh up around the front of the thigh, as in 3, across the back and once around the body and down again as in 2. Other bandages appropriate to various parts of the body are also illustrated that by their help the proper method of their application may be understood. See pages 132, 134, 136, 137. The triangular bandage (see p. 88) made from a large handkerchief or piece of muslin a yard square, cut or folded diagonally from corner to corner, will be found invaluable in emergency cases. It is easily and quickly adjusted to almost any part of the body, and may be used for dressing wounds, or as a bandage for fractures, etc.

CHAPTER VI

Ordinary Poisons

*Unknown Poisons—Antidotes for Poisoning by Acids and Alkalies—
The Stomach Pump—Emetics—Symptoms and Treatment of
Metal Poisoning—Narcotics.*

First Aid Rule 1.—Send at once for physician.

Rule 2.—Empty stomach with emetic.

Rule 3.—Give antidote.

In most cases of poisoning emetics and purgatives do the most good.

UNKNOWN POISONS.—Act at once before making inquiry or investigation.

First Aid Rule.—Give two teaspoonfuls of chalk (or whiting, or whitewash scraped from the wall or a fence) mixed with a wineglass of water. Beat four eggs in a glass of milk, add a tablespoonful of whisky, and give at once.

Meanwhile, turn to p. 186, and be prepared to follow Rule 2 under Suffocation, in case artificial respiration may be necessary, in spite of the stimulant and antidotes. After having taken the first steps, try to ascertain the exact poison used, but waste no time

Alkalies

at the start. If you can find out just what poison was swallowed, give the treatment advised under that poison, excepting what you may already have given.

ACIDS.—Symptoms: Corrosion or bleeding of the parts with which they come in contact, followed by intense pain, and then prostration from shock. Nitric acid stains face yellow; sulphuric blackens; carbolic whitens the mucous membrane, and also causes nausea and stupor.

Treatment.—*Carbolic*: Give a tablespoonful of alcohol or wineglass of whisky or brandy at once; or one tablespoonful of castor oil, also a half pint of sweet oil, also a pint of milk. Put to bed, and apply hot-water bottles.

Nitric and Oxalic: Chalk, lime off walls, white-wash scraped off fence or wall, one teaspoonful mixed with a quarter of a glass of water. Give one tablespoonful castor oil, and half a pint of sweet oil. Inject into the rectum one tablespoonful of whisky in two of water.

Sulphuric: Soapsuds, half a glass; a pint of milk.

Other Acids: Limewater, or two teaspoonfuls of aromatic spirit of ammonia diluted with a glass of water. One tablespoonful of castor oil.

ALKALIES.—Symptoms: Burning and destruction of the mucous membrane of mouth, severe pain, vomiting and purging of bloody matter, rapid death by shock.

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Ammonia; Potash; Lye; Caustic Soda; Washing Soda: Give half a glass of vinegar mixed with half a glass of water; also juice of four lemons in two glasses of water. One teaspoonful of castor oil in half a glass of olive oil. If prostrated, give tablespoonful of whisky in a quarter of a glass of hot water.

METALS.—Symptoms: Great irritation, cramps and purging, suppression of urine, delirium or stupor, collapse, and generally death.

Arsenic; Paris Green; Fowler's Solution; "Rough on Rats": Intense pain, thirst, griping in bowels, vomiting and bloody purging, shock, delirium. Patient picks at the nose. Send to druggist's for two ounces hydrated sesquioxide of iron, the best antidote, and give tablespoonful every quarter hour in half a glass of water. Meanwhile, or if antidote is not to be had, give a glass or two of limewater, followed by a teaspoonful of mustard dissolved in a glass of water, followed by warm water in any quantity.

Copper; Blue Vitriol; Verdigris: Give one tablespoonful of mustard in a glass of warm water. After vomiting, give whites of three eggs, one pint of milk.

Mercury; Corrosive Sublimate; Bug Poison; White Precipitate; Bichloride of Mercury: Give whites of four eggs for every grain of mercury suspected; cause vomiting by giving a tablespoonful of mustard mixed with a glass of warm water, or thirty grains of powdered ipecac mixed with half a glass of water.

Silver Nitrate: Give two teaspoonfuls of table salt

Narcotics

dissolved in two glasses of hot water. After half an hour give a tablespoonful of castor oil.

Phosphorous; Matches: Give teaspoonful of mustard mixed in a glass of water. After vomiting has occurred, give a tablespoonful of gum arabic dissolved in a tumblerful of hot water. An hour later give tablespoonful of Epsom salts dissolved in a glass of water. GIVE NO OIL.

Antimony; Tartar Emetic. Symptoms as stated for metals. Give thirty grains of powdered ipecac stirred in wineglass of water, even if vomiting has occurred. Give three cups of strong tea, or hot infusion of oak bark, and two teaspoonfuls of whisky in wineglass of hot water. Use hot-water bottles to keep patient warm.

NARCOTICS.—*Aconite; Belladonna; Camphor; Digitalis; Ergot; Hellebore; Lobelia:* These all cause nausea, numbness, stupor, rapidity of the heart followed by weakness of heart, delirium or convulsions, coma, and death. There is often an acid taste in mouth, with dryness of throat and mouth, fever, vomiting and diarrhea, with severe pain in the bowels. Pupils are dilated.

In either case use the stomach pump at once. If no pump is at hand, siphon out stomach with rubber tube and funnel. If tube is not available, give thirty grains of powdered ipecac stirred in a wineglass of water, followed by two glasses of warm water. As the patient vomits, give more warm water. When vomit-

ing ceases, give two cups of strong hot coffee, and then a tablespoonful of castor oil.

Keep patient awake by rubbing; do not exhaust him by walking him about. He must lie flat. If prostration follows, give two teaspoonfuls of whisky in wineglass of hot water from time to time, if repetition is necessary.

Alcohol; Liquors Containing It: Symptoms of drunkenness, stupor, drowsiness, irritability of temper, rapid, weak heart, sleep, coma. Breath testifies.

If possible, use stomach pump early, or tube and funnel. Or give thirty grains of powdered ipecac stirred in a wineglass of water, and when vomiting ceases give thirty drops of aromatic spirit of ammonia in a wineglass of water every half hour till pulse has become full and rapid. Then apply cold to the head and heat to the extremities.

Chloral; Patent Sleeping Medicines; "Knock-out Drops." Symptoms: Nausea, coldness and numbness, stupidity, prostration, often vomiting and purging, sleep, coma. Heart very weak, with pulse at wrist very feeble. Constriction of the mouth and throat, with dryness. Pain in bowels is marked before stupor appears.

Use stomach pump if possible, or empty stomach with rubber tube and funnel, siphoning fluids out. Or give thirty grains of powdered ipecac stirred in a wineglass of water. When vomiting ceases, give two teaspoonfuls of whisky in half a glass of hot water. Give

Narcotics

hypodermic injection of sulphate of strychnine, one-twentieth of a grain every two or three hours, till patient is roused and weakness is past. Rubbing of the surface, application of hot-water bottles to the body and legs.

If breathing ceases, follow Rule 2 under Suffocation (p. 186) till breathing is well established again.

Opium; Morphine; Laudanum; Paregoric; Soothing Syrups. Symptoms: Drowsiness, sleep, stupor when roused, pupils very small—"pin point" unless patient is used to the drug—constipation, cold skin.

Use stomach pump, if at hand. Or give emetic of thirty grains of powdered ipecac stirred in a wine-glass of water, followed by two glasses of warm water, as vomiting proceeds. Let the patient inhale ammonia or smelling salts. Give him half a grain of permanganate of potash dissolved in a wineglass of water, every half hour. Inject two ounces of black coffee, at blood heat, into the rectum.

Rub the lower part of the body and legs briskly toward the heart, while artificial respiration is being carried out. See Rule 2 under Suffocation (p. 186). Thirty drops of tincture of belladonna to an adult, every hour, will assist the breathing. Do not exhaust the patient by walking him around, slapping him with wet towels, or striking him on the calves; keep him awake by rubbing.

Tobacco when Swallowed: Nausea and vomiting occur, with severe pain and great prostration; de-

lirium or convulsions may follow. The heart, at first rapid and full, becomes weak and compressible.

Give emetic at once: thirty grains of powdered ipecac stirred in wineglass of water, followed by two glasses of warm water, by degrees. Give whisky, two teaspoonfuls in wineglass of hot water. Keep patient warm.

Nux Vomica; Strychnine. Symptoms: Excitement, rapid heart action, restlessness, panic of apprehension, twitching of forearms and hands, possibly convulsions, during consciousness.

Use stomach pump, if possible, or give thirty grains of powdered ipecac stirred in a wineglass of water. Then, when vomiting has ceased, give twenty grains of chloral, together with thirty grains of bromide of sodium in half a glass of water, at blood heat, injected into the rectum. Give twenty grains of bromide of sodium in a wineglass of water, every hour, by the mouth.

If convulsions, put chloroform before nose and mouth, as follows: pour twenty drops of chloroform on a handkerchief and hold it close to the mouth, letting air pass freely under it. Stop when patient relaxes. Resume if he becomes rigid again.

Cocaine. Symptoms: General nervousness, irritability of temper, wakefulness, followed quickly by great pallor, dilatation of the pupils, unconsciousness, and convulsions.

Give the patient two teaspoonfuls of whisky in a

Narcotics

wineglass of water every hour. Give, if possible, a hypodermic of a thirtieth of a grain of strychnine, every two hours, or as he may require it, to keep the pulse full and strong. Use hot-water bottles to feet and legs.

Phenacetin; Acetanilid; Headache Powders: Give two teaspoonfuls of whisky in a wineglass of hot water. If the heart flags, give tincture of digitalis, five minims in tablespoonful of water, every two hours, or till three doses are given. It is better to use digitalin, one one-hundredth of a grain hypodermically, if possible.

CHAPTER VII

Food Poisoning

Food Containing Bacterial Poisons Resulting from Putrefaction; Food Infected with Disease Germs; Food Containing Parasites—Tapeworm—Trichiniasis—Potato Poisoning.

FOOD POISONING.—Much the same symptoms from all meats, fish, shellfish, milk, cheese, ice cream, and vegetables; namely, vomiting, cramps, diarrhea, headache, prostration, weak pulse, cold hands and feet, possibly an eruption.

First Aid Rule 1.—Rid patient of poison. Cause repeated vomiting by giving three or four glasses of warm water, each containing half a level teaspoonful of mustard. Put finger down throat to assist. Empty bowels by giving warm injection of soapsuds and water by fountain syringe.

Rule 2.—Support heart and rally nerve force. Give teaspoonful of whisky in tablespoonful of hot water every half hour, as needed. Put hot-water bottles at feet and about body.

Conditions, Etc.—Bacterial poisons, constituting irritants of the stomach and bowels, are found in

Food Poisoning

certain mussels, oysters from artificial beds, eels out of stagnant ditches—as well as the uncooked blood of the common river eel—certain fish at all times, certain fish when spawning, putrefied fish, fermented canned fish, sausages of which the ingredients have putrefied, putrefied meat, imperfectly cured bacon, putrefied cheese, milk improperly handled and not cooled before being transported, ice cream which fermented before freezing, or ice cream containing putrid gelatin, and mouldy corn meal and the bread made from it.

These poisons are called toxins, or toxalbumins, or bacterial proteids. They are no longer called ptomaines, because many ptomaines are not poisonous. They are formed within the cells of the bacteria, and result from the combination of certain constituents of the food material that nourishes the bacteria, in some way not quite understood. Some decomposition must have taken place in the food before it can furnish to the bacteria the nourishment it needs. If this has happened, the bacteria multiply rapidly, and the toxins that are formed are taken up by the lymphatics and carried away from the tissues as fast as possible. But so great is their virulence that they act on several vital organs before they can be antagonized by the natural elements of the blood.

Symptoms.—The symptoms are much the same in all the cases of bacterial poisoning mentioned. Sudden and violent vomiting and diarrhea appear a few hours after eating the spoiled food, or may be delayed.

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There may be headache, colic, and cramps in the muscles. Marked prostration and weak pulse with cold hands and feet are characteristic. The appearance of skin eruptions is not uncommon. The occurrence of such symptoms in several persons, some hours after partaking of the same food, is sufficient to warrant one in pronouncing the trouble food poisoning.

Treatment.—The objects of treatment are to rid the patient of the poison, and to stimulate the heart and general circulation, and draw on the reserve nerve force. It is best to procure medical aid to wash out the stomach, but when this is impossible, the patient should be encouraged to swallow plenty of tepid water and then vomit it. If there is no natural inclination to do so, vomiting may be brought about by putting the finger in the back of the throat. The same process should be repeated a number of times, and the result will be almost as good as though a physician had used a stomach tube. A teaspoonful of salt or tablespoonful of mustard in the water will hasten its rejection. Then the bowels should likewise be emptied. If vomiting continues this will not be possible by means of drugs given by the mouth, although calomel may be retained given in half-grain tablets hourly to an adult, until the bowels begin to move, or till eight to ten tablets are taken. When vomiting is excessive, emptying of the bowels may be brought about quickly by giving warm injections of soapsuds into the bowel with a fountain syringe. Brandy or whisky in tea-

Infected Food

spoonful doses given in a tablespoonful of hot water at half-hour intervals should follow the emptying of the stomach and bowels, and the patient must be kept quiet. He must also be kept warm by means of hot-water bags and blankets.

INFECTED FOOD.—A frequent source of illness is infection by disease germs transmitted in food. The meat of animals slaughtered when sick with abscess, pneumonia, kidney disease, diarrhea, or anthrax (malignant pustule) carries disease germs and causes serious illness; so does the meat of animals killed after recent birth of their young, and probably having fever. Oysters may be contaminated with excrement from typhoid patients, and may then transmit the disease to those who eat them.

Milk from diseased animals, or contaminated with germs of typhoid fever, scarlet fever, tuberculosis, diphtheria, etc., is apt to cause the same disease in the human being who drinks it.

If such infected food is eaten raw, the diseases with which it is contaminated may be transmitted. If subjected to cooking at a temperature of at least the boiling point, comparative safety is secured; but the toxins accompanying the disease germs in the infected food are not as a rule rendered harmless. Treatment must be directed to each disease thus transmitted.

Poisoning resulting from eating canned meats has sometimes been attributed to supposed traces of tin, zinc, or solder, which have become dissolved in the

fluids of the meat, but in the vast majority of cases such poisoning is due to toxins accompanying the germs of putrefaction, the meats having been unfit for canning at the outset. In such cases the symptoms are the same as in other food poisoning, and the treatment must be such as is elsewhere directed (see pp. 147 and 149).

While human breast milk is germ free, the cows' milk sold in cities is a very common source of disease. Scrupulous care of the cows, of the clothing and hands of the milkers, of the stables at which the herds are quartered, and of the cans, pails, and pans used, reduces to a minimum the amount of filth and impurity otherwise mixed with milk. In the household, as well as during transportation, milk should be kept cool, with ice if necessary. It should also never be left uncovered, for it readily absorbs gases, effluvia, and contaminating substances in the air, and affords an excellent medium for the growth and propagation of germs. When partially or entirely soured, it should not be used, except in the preparation of articles of food by cooking, as directed in cook books. It should never be used if there is any doubt about its purity. Unless all doubt has been removed, it is best to subject milk intended for children's consumption to a temperature of 160° F. for ten minutes, and then put it on the ice, especially during hot weather. Germs are thus rendered harmless, and the nourishing qualities of the milk remain unimpaired.

Tapeworm

Summer diarrhea of children, also called cholera infantum, occurs as an epidemic in almost all large cities during the hottest days of summer. The disease is largely fatal, especially during the first hot month, because the most susceptible and tender children are the first affected. It is due to the absorption into the systems of these children of the toxins formed during the putrefying of milk in the stomachs and bowels of the little sufferers. Clean, pure sweet milk, free from bacteria should be used to prevent the occurrence of this disease. Its treatment is outlined in Vol. III. Exactly what bacteria cause the disease is not decided. Possibly the milk is infected, but probably the poisonous results come from toxins.

FOOD CONTAINING PARASITES.—The parasites found in food in this country are echinococcus, guineaworm, hookworm, trichina, and tapeworm. Echinococcus cannot be understood or diagnosed by the layman. Guineaworm is excessively rare in the United States; it gains access into the body through drinking water which contains the individuals. Hookworm is the cause of “miners’ anæmia,” and is extremely rare in this country.

The entrance of living food parasites can be absolutely prevented by thorough cooking of meats, especially pork and beef. Heat destroys the “measles” and the trichina worms.

TAPEWORM.—This is developed in man after eating “measly” beef or pork. “Measles” are em-

bryo tapeworms called, from their appearance, "bladder worms." In from six to ten weeks after being received into the intestine of a man, these bladder worms become full grown, and measure from ten to thirty feet in length—the tapeworms.

Symptoms.—Vertigo, impairment of sight and of hearing, itching of the nose, salivation, loss of appetite, dyspepsia, emaciation, colic, palpitation of the heart, and sometimes fainting accompany the presence of the tapeworm. Generally the condition becomes known through the passage in the excrement of small sections of the worm. These sections resemble flat portions of macaroni.

Treatment.—This, to be successful, must be directed by a physician. When no physician can be procured, the patient may attempt his own relief. After fasting for twenty-four hours, pumpkin seed, from which the outer coverings have been removed by crushing, are soaked overnight in water and taken on an empty stomach in the morning; a child takes one or two ounces thoroughly mashed and mixed with sirup or honey, and an adult four ounces (see Vol. III, p. 245).

TRICHINIASIS.—This is a dangerous disease caused by the presence in the muscles and other tissues of the trichinæ, little worms which are swallowed in raw or partly cooked pork, ham, or bacon. Nausea, vomiting, colic, and diarrhea appear early, generally on the second day after eating the infected meat. Later, stiffness of the muscles occurs, with great ten-

Potato Poisoning

derness, swelling of the face and of the extremities, sweating, hoarseness, difficult breathing, inability to sleep, bronchitis, and pneumonia.

There is no treatment for the disease. Many cases which are not fatal are probably considered to be obscure rheumatism. Many cases of pneumonia are caused by the worm.

POTATO POISONING.—There remains one variety of food poisoning which needs mention, since it occurs when least expected, and when proper food has been subjected to natural growth. As the potato belongs to the botanical family containing the dangerous belladonna, tobacco, hyoscyamus, and stramonium, it is not surprising that it should also contain a powerful poisonous alkaloid, namely, solanine. Solanine is developed in potatoes, especially during their sprouting stage. Violent vomiting and diarrhea and inflammation of the stomach and bowels are caused by it. Careful peeling of sprouting potatoes, and removal of their eyes, will lessen, if not wholly obviate, the danger from eating them. This form of food poisoning is rare.

CHAPTER VIII

Bites and Stings

Several Kinds of Mosquitoes—Cause of Yellow Fever—Bee, Wasp, and Hornet Stings—Wood Ticks, Lice, and Fleas—Scorpions and Centipedes—Poisonous Snakes—Dog and Cat Bites.

MOSQUITOES.—The female mosquito is the offender. During or after sucking blood she injects a poison into the body which causes itching, swelling, and, in some susceptible persons, considerable inflammation of the skin. The bites of the mosquitoes living on the shores of the Arctic Ocean and in the tropics are the most virulent. The most important relation of mosquitoes to man was only recently discovered. They are probably the sole cause of malaria and yellow fever in the human being. The malarial parasite which lives in the blood of man, when he is suffering from malaria, first inhabits the body of a certain kind of mosquito. The mosquito acquires the undeveloped parasite by biting the human malarial patient, and then acts as a medium of infection by transmitting the active parasite to some healthy man, through the bite.

The more common house mosquito, the *Culex*, does not carry the parasite of malaria, and it is important to be able to distinguish the *Anopheles* which is the source of malaria. The *Anopheles* is more common in

Mosquitoes

the country, while the *Culex* is a city pest. The *Culex* has very short palpi, the name given to the projections parallel to the proboscis; while those of *Anopheles* are so large that it appears to have three probosces. There are no markings on the wings of the ordinary species of *Culex*, while the wings of *Anopheles* are distinctly mottled. The *Culex*, sitting on a wall or ceiling, holds its hind legs above its back and its body nearly parallel to the wall or ceiling, but the *Anopheles* carries its hind legs either against the wall or hanging down (rarely above the back), and its body, instead of lying parallel to the wall or ceiling, hangs away at an angle of about forty-five degrees from it.

The *Culex* lays her eggs in sinks, tanks, cisterns, and water about houses, but the *Anopheles* deposits her ova in shallow pools and sluggish streams, especially those on which is a growth of green scum or algæ. Such are the main distinguishing features of the malaria-carrying mosquito, the *Anopheles*, and the commoner house variety, the *Culex*.

To prevent malaria, mosquito bites must be prevented by nettings in houses, especially for the protection of sleepers. Pools, ponds, and marshy districts must be drained in order to destroy the breeding places of *Anopheles*, and in the malarial season, petroleum (kerosene) must be poured on the surface of such waters to arrest the development of the immature insects (larvæ).

The mosquito is believed to be the sole cause of

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yellow fever, being capable of communicating the germ of the disease to man by its bite two weeks after it has itself been contaminated with the germ in feeding on the blood of a yellow-fever patient. This invaluable discovery was made by Dr. Walter Reed, U. S. A., in 1901, as a result of his labors and those of other members of the yellow-fever commission of the U. S. Army in Cuba, involving the death of one of the members of the commission (Dr. Lazear), and utilizing the heroism of a number of our young soldiers who voluntarily offered themselves to be bitten by mosquitoes that had previously bitten yellow-fever patients, and who experimentally occupied premises containing all sorts of articles infected by yellow-fever patients. The result of their research proves that yellow fever is not contagious at all, in the usual sense, but is communicated only through the medium of mosquitoes. This shows the fallacy of many quarantine rules regarding yellow-fever patients, and of the fear of nursing the sick, and will result in controlling the disease.

In the case of malaria or yellow fever, there is a vicious circle into which man and the mosquito enter; malaria and yellow-fever patients contaminate the mosquitoes which bite them, and the mosquitoes in their turn infect man with these diseases. A patient with malaria coming into a nonmalarial place, and being bitten by mosquitoes, may lead to an epidemic of the disorder which becomes endemic. To terminate this condition, it is necessary to prevent the contact of man

Bee, Wasp, and Hornet Stings

with mosquitoes and to kill these insects. Both malaria and yellow fever will doubtless be practically eradicated before long through the result of these scientific discoveries.

Treatment of Mosquito Bites.—To prevent mosquitoes, fleas, lice, horseflies, etc., from biting, it is necessary merely to dip the clean hands into a pail of water in which, while hot, one ounce of pure carbolic acid was dissolved, and while they are thus wet rub the solution over all the exposed skin and allow it to dry naturally. A mixture of kerosene (petroleum) and water used in the same way will also afford protection. All poisons introduced into the body by insects are of an acid nature, and to this quality are due the pain and irritation which it is our object to overcome. The best remedy, naturally, is an alkali of some sort. Water of ammonia, diluted, or a strong solution of saleratus or baking soda in water, are the two most successful remedies to apply, either through bathing, or on cloths saturated in one of the solutions. Clean clay, mixed with water to make a mud poultice, is a useful application in emergencies.

BEE, WASP, AND HORNET STINGS.—The pain and swelling are produced by the poison of the insect which leaves the poison bag at the base of the barb at the instant that the person is stung. The bee stings but once, as the sting being barbed is broken off, and is retained in the flesh of the victim. The sting of the wasp and hornet is merely pointed, and is not

Winslow and Ferris

lost during the stinging process so that they can repeat the act. Bee keepers, after being stung a number of times, usually become immune, i. e., they are no longer poisoned by bites of these insects.

It is well to extract the sting of bees before all of the poison has come away. A fine pair of forceps is useful for this purpose; or, by pressing the hollow tube of a small key directly down over the puncture made by the sting, it may be squeezed out.

Ammonia water, as recommended for mosquitoes, is the best remedy to relieve the pain.

WOOD TICKS.—Ticks inhabit the woods and bushes throughout the temperate zone, and at certain periods during the summer season attack passing men and animals.

The common tick is nearly circular in shape, very flat, with a dark, brown, horny body about one-sixteenth to one-eighth inch in diameter. Each of its eight legs possesses two claws, and the proboscis incloses feelers which are similarly armed. The beetle plunges its barbed proboscis into the flesh of man or animals, and holds on very firmly with its other members till it is gorged with blood, growing as large as a good-sized bean, when it drops off. The bite is painless, and it is not until the insect is engorged with blood that it is perceptible; if, however, attempts are made to remove the tick before it is ready to let go, the proboscis may be torn off and left in the skin, when painful local suppuration will follow.

Lice

Treatment.—As the presence of tick is far from agreeable, the insect may often be removed by painting it with turpentine, which either kills it or causes the claws to be relaxed; in either case the tick loosens its hold and drops to the ground. A tropical variety, carapato, buries the whole head in the flesh of its host before it is perceived, and if turpentine does not loosen its hold, the head must be dug out with a clean needle or knife blade.

LICE (*Pediculi*).—Head lice are most common. They are gray with black margins, about one-twenty-fifth to one-twelfth inch long, and wingless. The color changes with the host, as the lice are black on the negro, and white in the case of the Eskimos. The female lays fifty to sixty eggs ("nits"), seen as minute, white specks glued to the side of a hair; usually not more than one or two on a single hair. The eggs hatch in six days.

The irritation produced by the presence of the parasites on the head leads to general itching, more particularly on the lower part of the back of the head. The constant scratching starts an inflammation of the skin with the formation of pimples, weeping spots, and crusts, from the dried discharge, possessing a bad odor. The denuded spots becoming infected, the neighboring glands enlarge and are felt as tender lumps beneath the skin at the back of the neck, under the jaw, or at either side of the neck. Whenever there are persistent itching and irritation of the scalp, particularly at the

back of the head, lice or " nits " should be sought for. Sometimes it is more easy to find them on a fine-tooth comb passed through the hair. Lice are very common in dirty households, and are occasionally seen on the most fastidious persons, who accidentally acquire them in public places or conveyances.

Treatment.—The hair should be cut short when permissible. Any crusts on the head should be softened by the application of sweet oil, and then removed by washing in soap and warm water. Petroleum or kerosene is a good remedy. It must be rubbed on the head two successive nights, the head being covered by a cap, and washed off each morning with hot water and soap. The patient must be cautioned not to approach an open flame after kerosene has been put on his head.

The eggs or " nits " are next to be attacked with vinegar, which is sponged on the hair and the fine-tooth comb plied daily for a week. The remaining irritation of the scalp can be cured by washing the head daily and applying sweet oil.

A simpler plan consists of drenching hair and scalp twice with cold infusion of (poisonous) larkspur seed, made by steeping for an hour an ounce of the seed in six ounces of hot water.

This treatment will destroy both insects and eggs. After twenty-four hours the hair and scalp must be shampooed with warm water thoroughly.

CLOTHES LICE.—These insects are a trifle larger than the head lice, being one-twelfth to one-

Flea

eighth inch long, of a dirty, yellowish-gray color, and only infesting the most filthy people. The lice are generally only seen on the clothes, where they live, coming out on the body only to feed. The visible signs on the body are varying degrees of irritation from redness to ulceration, due to scratching. The treatment is simply cleanliness of the body and clothes.

CRAB LICE.—The crab louse or “crab” inhabits the skin covered by hair about and above the sexual organs most frequently, and from thence spreads to the hairy region on the abdomen, chest, armpits, beard, and eye lashes. Itching and scratching first call attention to the presence of the parasites, which are even more troublesome than the other species.

Application of kerosene to the part is sufficient to kill the lice, but this treatment must be repeated several times at intervals of a week, in order to kill the parasites subsequently hatched.

FLEA.—Flea bites are recognized by the itching caused by the poison introduced by the insect, and by points of dried blood surrounded for a little while by a red zone. In the case of children and people with delicate skins, red or white lumps appear resembling nettlerash. Generally the skin is simply covered with minute, red points, perhaps raised a little by swelling above the surface, and when very numerous may remotely resemble the rash of measles. Fleas, unlike lice, do not breed on the body, but as soon as they are satiated leave their host. Their eggs are laid in cracks

in floors, on dirty clothes and similar spots, and it is only the mature flea which preys upon man. The human flea may infest the dog and return to man, but the dog flea is a distinct species, and never remains permanently on the human host. For these reasons it is not difficult to get rid of fleas after they have attacked the body, unless continually surrounded by them.

JIGGER OR SAND FLEA.—Also called *chique*, *chigo*, and *nigua*. It is common in Cuba, Porto Rico, and Brazil. About one-half the size of the ordinary flea, it is of a brownish-red color with a white spot on the back. The female lives in the sand and attacks man, on whom she lives, boring into the skin about the toe nail, usually, and laying her eggs under the skin, which gives rise to itching at first and then violent pain. The insect sucks blood and grows as it gorges itself, producing a white swelling of the skin in the center of which is seen a black spot, the front part of the flea. The flea after expelling its eggs drops off and dies. People with habitually sweaty feet are exempt from attacks of the pest.

Unless the flea is unattached, one must either wait until the insect comes away of its own free will, or remove it with a red-hot needle in order to destroy the eggs. The negroes peel the skin from the swelling with a needle and squeeze out the eggs. Ordinarily the bites do no permanent injury, but occasionally if numerous, or if the insect is pressed into the skin in

Scorpions and Centipedes

the efforts to remove it, or if sores resulting from bites are neglected, then violent inflammation, great pain, and even death of the part may result. Sound shoes and a night and morning inspection of the feet will protect against the inroads of the sand fleas.

FLIES.—The common housefly does not bite, but is constantly inimical to human health by conveying disease germs of typhoid fever, cholera, and other disorders from bowel discharges of patients suffering from these diseases to articles of food on which the insects light. Flies have been a fruitful source of sickness in military camps, as evidenced in the recent Spanish-American and Anglo-African campaigns. The bites of the sandfly, gadfly, and horsefly may be both relieved and prevented by the same means recommended in the case of mosquitoes for these purposes.

SCORPION OR CENTIPEDE STING.

First Aid Rule.—*Squeeze lemon juice on wound.*

SPIDER OR TARANTULA BITE.

First Aid Rule.—*Pour water of ammonia on bite. If patient is depressed, give strong coffee.*

SCORPIONS AND CENTIPEDES.—These both inhabit the tropics and semitropical regions, and lurk in dark corners and out-of-the-way places, crawling into the boots and clothing during the night. Scorpions sting with their tails, which are brought over the

head and back for the purpose, while holding on to the victim with their lobsterlike claws. The poisonous centipede has a flattened brownish-yellow body, with a single pair of short legs for each body segment, and long, many-jointed antennæ.

The wounds made by either of these pests are rarely dangerous, except in young children and those in feeble health. The stings are usually relieved by bathing with a two per cent solution of carbolic acid, with rum, or with lemon juice.

SPIDERS.—Many of the tropical spiders bite the human being. Trapdoor spiders are among the commonest of these pests. Their bodies grow to great size, two to two and a half inches long, and are covered with hair giving them a horrid appearance. They live in holes bored in the ground, and provided with a trapdoor contrivance which is closed when the insect is at home.

The trapdoor spider resembles the tarantula, by which name it is usually known in Cuba and Jamaica, but is somewhat smaller and commoner. Neither the stings of the trapdoor spider nor true tarantula are usually dangerous although the wounds caused by the bites may heal slowly.

Application of water of ammonia and of the other remedies recommended for mosquito bites (p. 158) are indicated here, and if the patient is generally depressed by the poison, strong coffee forms a good antidote.

Snake Bite

SNAKE BITE.

First Aid Rule 1.—Make the wound bleed. Cut slit through the wound, lengthwise of limb, two inches long and half an inch deep. Squeeze tissues. Do NOT SUCK THE WOUND.

Rule 2.—Keep poison out of general circulation. Tie large cord or bandage tightly about part between wound and heart. Loosen in fifteen minutes.

Rule 3.—Use antidote. Wash wound and cut with fresh solution of chloride of lime (one part to sixty parts of water). Inject anti-venene with hypodermic syringe, ten cubic centimeters, as on label. Or, inject with hypodermic syringe thirty minims of solution of permanganate of potash (five grains to two ounces of water), three times in different places. If no syringe at hand, pour permanganate solution into wound.

Rule 4.—Support heart if weak. Inject with hypodermic syringe one-thirtieth grain of sulphate of strychnine into leg. Repeat as needed every thirty minutes with caution.

Rule 5.—Give no whisky or other liquor. Do not burn the wound.

SNAKE BITE.—There are many different species of poisonous snakes in the United States. The more common are the rattlesnake, the moccasin, the copper-head, and the common viper.

All the venomous snakes have certain characteristics by which they may be distinguished from their

harmless brethren. The head is generally broad and flat and of a triangular shape, the wide, heavy jaws tapering to a point at the lips. There is a depression or pit between the nostril and eye on the upper lip, hence the name "pit vipers" given to poisonous snakes. The pupil of the eye is long and vertical, of an oval or elliptical shape.

Venomous snakes are thicker in proportion to their length than harmless snakes, the surface of their bodies is rougher, and their tails are blunt or club-shaped. Conversely, harmless snakes possess long narrow heads, the pupils of their eyes are round, not vertical slits, and their bodies are not thick for their length, but long and slim with pointed tails. The bite of vipers of all kinds is much more poisonous in tropical regions, and in the North fatal snake bite is a rare occurrence.

If there is a doubt whether a snake is poisonous, the neck may be pressed down against the ground between the jaws of a forked stick, and the poison fangs looked for without danger. These hang directly down from the front part of the upper jaw, or are thrust horizontally forward just in front of the upper lip, and may drip saliva and venom.

In Cuba and Porto Rico there is a viper called Juba, or Boaquirá, which is a counterpart of the Northern rattlesnake, and the most poisonous of the many species in that region. Among venomous species of the Philippines are two boas and also a viper from nine to ten feet long, which exceptionally pursues and attacks

Snake Bite

man. This snake is easily killed by a blow on the neck. Another small viper with a club-shaped tail, inhabiting these islands, is nocturnal in its habits, and may get into boots at night. Boots, therefore, should always be inspected before one puts them on in the morning.

Usually it is only the young, old, and weak who succumb to snake bite.

Symptoms.—The symptoms of snake bite of all poisonous species are similar. At first there is some pain in the wound, which rapidly increases together with swelling and discoloration until death of the part may ensue. The vital centers in the brain controlling the heart and breathing apparatus, are paralyzed by the poison. There is often drowsiness and stupor, and the breathing is labored and the pulse weak and irregular, with faintness and cold sweats.

Treatment.—The treatment consists first in keeping the poison out of the general blood stream. With this purpose in view a handkerchief, piece of cotton clothing, string, or strap should be immediately wound about the bitten limb above the wound, between it and the heart. This will retard absorption of the poison only for a time; it is said twenty-five minutes. The knife is the most effective means of removing the poison by making an oval cut on each side of the wound so that the two incisions meet and remove all the flesh below and around the wound. Bleeding should be encouraged to drain out the poison. The skin containing the wound may be lifted up, and

the whole wound cut out by one snip of the scissors where this is practicable.

Some advocate burning out the wound with a red-hot wire, or darning needle, instead of cutting, but the treatment is less effective and more painful. Rambaud forbids burning. As to the general condition: if stupor is a prominent symptom the patient must be made to move about and exercise to keep alive his nerve centers. Otherwise one tablespoonful of whisky may be given in half a cup of hot water hourly, to sustain the weakened heart and respiration until recovery ensues.

The most effective treatment, according to Dr. George Rambaud, Director of the Pasteur Institute of New York City, is thorough washing of the wound (after it has been opened with the knife) with freshly prepared solution of chloride of lime, in the proportion of one part of lime to sixty of water. The burning of a wound is bad practice. If necessary, chloride-of-lime solution should be injected into the tissues around the wound. One about to go into a place where the most venomous snakes are found should inject into himself a dose of Calmette's antivenomous serum every two or three weeks as a means of prevention. If the serum is used, whisky should not be given in the treatment of one who has been bitten, for the antivenene is a powerful cell stimulator.

Calmette, the Director of the Pasteur Institute in Lille, France, several years ago discovered antivenomous serum. That serum is efficient for the bites

Dog Bite or Cat Bite

of most of the venomous snakes of different countries, including the rattlesnake, cobra, python, etc.

It is prepared in the dry form so that it can be carried easily, and will keep almost indefinitely. The proper course to be followed by persons going into countries infested by venomous snakes is always to have on hand a few doses of it. Its value has been positively demonstrated within the last few years in India, where it is used in the British Army, as well as in other countries.

In the fluid form it should be used hypodermically, a dose of ten cubic centimeters being injected within eighty or ninety minutes of the reception of the poison.

DOG BITE OR CAT BITE. (See Hydrophobia, Vol. V, p. 264.)

First Aid Rule 1.—Make sure animal is mad. Send patient to Pasteur institute if one is within reach.

Rule 2.—Remove poison from wound. Encourage bleeding by squeezing tissue about wound. Suck wound, if you have no cracks in lips, and spit out fluid. Pour hot carbolic solution into wound (a third of a teaspoonful of carbolic acid to a pint of hot water).

Rule 3.—Cauterize. Dip wooden meat skewer, or lead pencil, into pure nitric acid, and rub into wound. Or, use red-hot poker, or red-hot nail grasped by tongs or pincers, or red coal from fire.

Rule 4.—Do not kill the animal. If he is alive and well at the end of a week, he was not mad.

CHAPTER IX

Burns, Scalds, Frostbites, etc.

Classes of Burns—Treatment—Burns Caused by Acids and Alkalies—First Aid Rules for Frostbites—Real Freezing—Ingrowing Toe Nail—Fainting—Suffocation—Fits.

BURNS AND SCALDS.—If slight, skin very red, unbroken.

First Aid Rule.—Cover with cloths wet in strong solution of baking soda in cold water. Dry gently, and spread with white of egg, thick.

If deeper, blisters, skin broken, thick swelling; there may be some bleeding.

First Aid Rule 1.—Stop pain quickly. Cut away clothing very gently. Break no blisters. Cover with Carron oil (equal parts of limewater and linseed or olive oil) and light bandage. Give fifteen drops of laudanum¹ every half hour in tablespoonful of water, till relieved in part or three doses are taken.

Rule 2.—Combat shock. If patient is cold, pulse weak, head confused, give tablespoonful of whisky in a quarter of a glass of hot water. Put hot-water bottles at feet.

¹ Caution. Dangerous. Use only on physician's order.

Burns and Scalds

Rule 3.—Quench thirst with pieces of ice held in mouth or a swallow of cold milk.

See page 174 for subsequent treatment.

A burn is produced by dry heat, a scald by moist heat; the effect and treatment of both are practically identical. Burns are commonly divided into three classes, according to the amount of damage inflicted upon the body.

First Class.—There is redness, pain, and some swelling of the skin, followed, in a few days, by peeling of the surface layer (epidermis) and recovery. Sunburn and burns caused by slight exposures to gases and vapors fall into this category.

Treatment.—The immediate immersion of the part in cold water is followed by relief, or the application of cloths wet with a saturated solution of saleratus or baking powder is useful. Anything which protects the burned skin from the irritating effect of the air is efficacious, and in emergencies any one of the following may be applied: starch, flour, molasses, white paint, or a mixture of white of egg and sweet oil, equal parts. Usually after the first pain has been relieved by bathing with soda and water, or its application on cloths, the employment of a simple ointment suffices, as cold cream or vaseline.

Second Class.—In this class of cases the inflammation is more severe and the deeper layers of the skin are involved. In addition to the redness and swelling

of the skin there are present blisters which appear at once or within a few hours. The general condition is affected according to the size of the burn. If half of the body is only reddened, death usually results, and a burn of a third of the body is often fatal. The shock is so great at times that pain may not be at once intense. Shock is evidenced by general depression, with weakness, apathy, cold feet and hands, and failure of the pulse. If the patient rallies from this condition, then fever and pain become prominent. If steam has been inhaled, there may be sudden death from swelling of the interior of the throat, or inflammation of the lungs may follow inhalation of smoke and hot air.

Third Class.—In this class are included burns of so severe a nature that destruction and death of the tissues follows; not only of the skin but of the flesh and bones in the worst cases. It is impossible to tell by the appearance of the skin what the extent of the destruction may be until the dead parts slough away after a week or ten days. The skin is of a uniform white color in some cases, or may be of a yellow, brown, gray, or black hue, and is comparatively insensitive at first. Pus ("matter") begins to form around the dead part in a few days, and the dead tissue comes away later, to be followed by a long course of suppuration, pain, excessive granulations ("proud flesh"), and, unless skillfully treated, by contraction of the surrounding area, leaving ugly scars and interfering with

Burns and Scalds

the appearance and usefulness of the parts. The treatment of such cases after the first care becomes that to be pursued in wounds generally (p. 50), and belongs within the domain of the surgeon.

Treatment of the More Severe Burns.—If the patient is suffering from shock he should receive some hot alcoholic drink, as hot water and whisky, and be put to bed under warm coverings with hot-water bags or bottles at his feet.

The clothing must be cut away from the burned parts with the greatest care, and only a portion of the body should be uncovered at a time and in a warm room. Pain may be subdued by laudanum¹; fifteen drops may be given to an adult, and the drug may be repeated at hour intervals in doses of ten drops until the suffering has been allayed. Lumps of ice held in the mouth will quench thirst, and the diet should be liquid, as milk, soups, gruels, white of egg, and water. The bowels should be moved daily by rectal injections of soap and warm water. As a matter of local treatment, the surface layer of the skin should be kept intact if possible. Blisters are not to be disturbed unless they are large and tense; if so, their bases may be pricked with a needle sufficiently to let out the fluid contents.

Carron oil (equal parts of olive oil and limewater) has been the common remedy for burns, and it is an efficient, though very dirty, dressing, useful if the skin

¹ Caution. Dangerous. Use only on physician's order.

is generally unbroken. It should be applied on clean, soft linen or cotton cloth, which is soaked in the oil, laid over the burned area, and covered with a thick layer of cotton batting and a bandage. When the skin is denuded, leaving a raw surface exposed, the burn must be treated on the same plan as wounds, and should be kept as clean and free from germs as possible. An ointment made of equal parts of boric acid and vaseline, spread thickly on clean cloth, is a good anti-septic preparation in cases where the skin is broken. It is best not to change the dressing oftener than once in two or three days, unless the discharge or odor are considerable. Fresh dressing is very painful and often harmful.

When the dressing is removed, warm saline solution (one teaspoonful of common salt in a quart of water) is allowed to flow over the burn until all discharge is washed off. Then the raw surface is dusted over with pure boric acid or aristol, and the boric-acid ointment applied as before. The cloth upon which the ointment is spread should be made free from germs by boiling in water, and then drying it in an oven and keeping it well wrapped in a clean towel except when wanted.

The same care is requisite as that described under wounds (p. 50) in regard to cleanliness.

Very extensive burns are most satisfactorily treated by complete immersion of the burned limbs or entire body in salt solution (same strength as above), which

Burn by Strong Acid

is kept at a temperature of from 94° to 104° F., according to the feelings of the patient. The patient lies in a bath tub on horsehair, or better, rubber mattress and rubber pillows; completely covered with water except the head. The urine and bowel discharges must be passed in the water, which is then changed, and the temperature is kept at an even mark by allowing warm water to continually run into the tub to displace that which runs out. The latter can be arranged by siphonage with a rubber tube. While this method requires more care, and running hot and cold water, it is the most comfortable treatment for these cases, usually attended by awful suffering, and at the same time it is most favorable to healing.

It is beyond the scope of this work to describe the various complications and the details of the after treatment in severe burns, including skin grafting, which may tax all the ingenuity of the skilled surgeon. It is hoped that the foregoing may give a clear idea of the treatment to be pursued in emergencies and may prove of some use to those who may unfortunately be compelled to care for burns during a considerable time without the aid of a physician.

BURN BY STRONG ACID.

First Aid Rule 1.—Neutralize the acid. Scatter baking soda thickly over burn, or pour limewater over it.

Rule 2.—Control pain. Wash off soda with stream

of water. Apply Carron oil (equal parts of limewater and linseed oil or olive oil). Bandage lightly.

BURN BY STRONG ALKALI.—As ammonia, quicklime, lye.

First Aid Rule 1.—*Neutralize the alkali. Pour vinegar over the burn.*

Rule 2.—*Control pain. Wash off vinegar with stream of water. Dry gently. Apply vaseline or cold cream.*

BURNS CAUSED BY STRONG MINERAL ACIDS OR BY ALKALIES.—If acids are the cause, the skin should not be washed at first, but either chalk, whiting, or some mild alkali, as baking soda, should be strewn over the burn, and then after the effect of the acid is neutralized, wash off the soda with stream of warm water. Dry gently with gauze. Apply Carron oil or paste of boric acid and vaseline, equal parts. If strong alkalies have been spilled on the skin, as ammonia, potash, or quicklime, then vinegar is the proper substance to employ, followed by washing. Then dry gently. Vaseline or cold cream is usually sufficient as after treatment. Limewater is useful in counteracting the effect of acids spattered in the eye. In the case of alkalies in the eye, the vinegar used should be diluted with three parts of water. Albolene or liquid vaseline is the best agent to drop in the eye after either accident, in order to relieve the irri-

Frostbite, Real Freezing

tation and pain, and the patient should stay in a dark room.

FROSTBITE, REAL FREEZING.—Nose, ears, fingers, toes; insensible to touch, stiff, pale or blue. Person may be unconscious.

First Aid Rule 1.—*Restore circulation. Rub gently, then vigorously, with snow.*

Rule 2.—*Restore heat very gradually. Sudden heat is fatal. Keep in cold room, and rub with cloth wet with very cold water till circulation is established. Then rub with equal parts of alcohol and water and expose gradually to heat of living room.*

Rule 3.—*If person ceases to breathe, resuscitate as if drowned. Open his mouth, grasp his tongue, and pull it forward and keep it there. Let another assistant grasp the arms just below the elbows and draw them steadily upward by the sides of the patient's head to the ground, the hands nearly meeting (which enlarges the capacity of the chest and induces inspiration.) (See pp. 30 and 31.) While this is being done, let a third assistant take position astride the patient's hips with his elbows resting on his own knees, his hands extended ready for action. Next, let the assistant standing at the head turn down the patient's arms to the sides of the body, the assistant holding the tongue changing hands if necessary to let the arms pass. Just before the patient's hands reach the ground the man astride the body will grasp the body with his*

hands, the ball of the thumb resting on either side of the pit of the stomach, the fingers falling into the grooves between the short ribs. Now, using his knees as a pivot, he will at the moment the patient's hands touch the ground throw (not too suddenly) his whole weight forward on his hands, and at the same time squeeze the waist between them, as if he wished to force something in the chest upward out of the mouth; he will deepen the pressure while he slowly counts one, two, three, four (about five seconds), then suddenly lets go with a final push, which will send him back to his first position. This completes expiration. (A child or a delicate person must be more gently handled.)

At the instant of letting go, the man at the head of the patient will again draw the arms steadily upward to the sides of the patient's head as before (the assistant holding the tongue again changing hands to let the arms pass, if necessary), holding them there while he slowly counts one, two, three, four (about five seconds).

Repeat these movements deliberately and perseveringly twelve or fifteen times in every minute—thus imitating the natural motions of breathing. Continue the artificial respiration from one to four hours, or until the patient breathes; and for a while after the appearance of returning life carefully aid the first short gasps until deepened into full breaths.

Keep body warm after this with warm-water bottles.

Frostbite

FROSTBITE.—The nose, chin, ears, fingers, and toes are the parts usually frozen, although severe results ending in death of the frozen part occur more often owing to low vitality of the patient than to the cold itself. In the milder degree of frostbite there is stiffness, numbness, and tingling of the frozen member; the skin is of a pale, bluish hue and somewhat shrunken. Recovery ensues with burning pain, tingling, redness, swelling and peeling of the epidermis, as after slight burns. The skin is icy cold, white, and insensitive in severe forms of frostbite, and, if not skillfully treated, becomes, later, either swollen and discolored, or shriveled, dry, and black. In either case the frozen part dies and is separated from the living tissue after the establishment of a sharp line of inflammation which results in ulceration and formation of pus, and thus the dead part sloughs off. It is, however, possible for a part thoroughly frozen to regain its vitality.

Treatment.—The essential element in the treatment is to secure a very gradual return of blood to the frozen tissues, and so avoid violent inflammation. To obtain this result the patient should be cared for in a cold room, the frozen parts are rubbed gently with snow, or cloth wet with ice water, until they resume their usual warmth. Then it is well to rub them with a mixture of alcohol and water, equal parts, for a time and expose them to the usual temperature of a dwelling room. Warm drinks are now administered to the patient. The

frozen member, if hand or foot, is raised high in the air on pillows and covered well with absorbent cotton and bandage. If much redness, swelling, and pain result this dressing is removed and the part is wrapped in a single thickness of cotton cloth kept continually wet with alcohol and water.

Subsequent treatment consists in keeping the damaged parts covered with vaseline or cold cream, absorbent cotton, and bandage. If blisters and sores result, the care is similar to that described for like conditions under burns. If death of the frozen part becomes inevitable, the hand or foot should be suspended in a nearly vertical position to keep the blood out, and the part bathed twice daily with a solution of corrosive sublimate (one 7.7 gr. tablet to pint of water), dusted well with aristol, and dressed with absorbent cotton and bandage until the dead tissue separates and comes away. If the frozen part is large it may be necessary to remove it with a knife, but this is not essential when the tips of the fingers or toes are frozen.

General Effect of Cold.—Sudden exposure to severe cold causes sleep, stupor, and death. Persons found apparently frozen to death should be brought into a cold room, which should be gradually heated, and the body rubbed with snow or ice water, and artificial respiration employed, as just directed. Attempts at resuscitation ought to be persistent, as recoveries have been reported after several hours of unconsciousness and apparent death from freezing.

Chilblains and Mild Frostbites

CHILBLAINS AND MILD FROSTBITES.—

The effects of severe cold on the body are very similar to those of intense heat, though they are very much slower in making their appearance. After a person has frozen a finger or toe he may not notice much inconvenience for days, when suddenly violent inflammation may set in. The fingers, ears, nose, and toes are the members which suffer most frequently from the effects of cold. Similar symptoms of inflammation, described under burns, also result from cold, that is, redness and swelling of the skin, blisters with more severe and deeper inflammatory involvement, or, in case the parts are thoroughly frozen, local death and destruction of the tissues. But it is not essential that the body be exposed to the freezing temperature or be frozen at all, in order that some harm may result, for chilblains often follow when the temperature has not been lower than 40° F., or thereabouts.

The effect of cold is to contract the blood vessels, with the production of numbness, pallor, and tingling of the skin. When the cold no longer acts then the blood vessels dilate to more than their usual and normal state, and more or less inflammation results. The more sudden the return to warmth the greater the inflammatory sequel.

Chilblains represent the mildest morbid effect of cold on the body. They exist as bluish-red swellings of the skin, usually on the feet or hands, but may attack the nose or ears, and are attended by burning, itching,

and smarting. This condition is caused by dilatation of the vessels following exposure to cold. It is more apt to happen in young, anæmic women. Chilblains usually disappear during warm weather. Scratching, friction, or the severity of the attack may lead to the appearance of blisters and sores. In severe cases the fingers and toes present a sausage-like appearance, owing to swelling.

Treatment.—Susceptible persons should wear thick, warm (not rough) stockings and warm gloves. The chilled members must never be suddenly warmed. Regular exercise and cold shower baths are good to strengthen the circulation, but the feet and hands must be washed in warm water only, and thoroughly dried. If sweating of these parts is a common occurrence, starch or zinc oxide should be dusted on freely night and morning. Cod-liver oil is an efficacious remedy in these cases; one teaspoonful of Peter Möller's pure oil three times daily after meals. The affected parts are bathed twice daily in a solution of zinc acetate (one dram to one pint of water), and followed by the application, on soft linen or cotton, of zinc-oxide ointment containing two per cent of carbolic acid. If this is not curative, iodine ointment mixed with an equal quantity of lard may be tried. Exposure to cold will immediately bring on a recurrence of the trouble. If the affection of the feet is severe the patient must rest in bed. If the parts become blistered and open sores appear, then the same treatment as for burns is

Ingrowing Toe Nail

indicated. Wash with a weak solution of corrosive sublimate (one tablet for surgical purposes in two quarts of warm water) and apply an ointment of boric acid and vaseline, equal parts, spread on soft, clean cotton or linen. Rest of the part and existence in a warm atmosphere will complete the cure.

INGROWING TOE NAIL.—This is a condition in which the flesh along the edges of the great toe nail becomes inflamed, owing either to overgrowth of the nail or to pressure of the soft parts against it. 'Improper footgear is the most common cause, as shoes which are too narrow across the toes, or not long enough, or those with high heels which throw the toes forward so that they are compressed by the toe of the boot, especially in walking downhill.

A faulty mode of cutting the toe nails in a healthy foot may favor ingrowing toe nails. Toe nails should be cut straight across, and not trimmed away at the corners to follow the outline of the toes—as then the flesh crowds in at the corners of the nails, and when the nail pushes forward in its growth it presses into the flesh. Nails which have a very rounded surface are more apt to produce trouble, because then the edges are likely to grow down into the flesh. Inflammation in ingrowing toe nail usually arises along the outer edge of the nail. The flesh here becomes red, tender, painful, and swollen so that it overlaps the nail. After a time "matter" or pus forms and finds its way under the nail, and the parts

about it ulcerate, and “proud flesh” or excessive granulation tissue springs up and imbeds the edge of the nail. Wearing a shoe, or walking, becomes impossible. The condition may last for months, or even years, if not rightly treated.

Treatment.—Properly fitting footgear must be worn—broad at the toes with low heels and of sufficient length. If pus (“matter”) forms, the cut edge should be raised up by pushing in a little absorbent cotton under the nail every day. Hot poultices of flaxseed meal, or other material will relieve any special pain and inflammation. Soaking the foot frequently in hot water, and observing especial cleanliness, will aid recovery. Tannic acid, or some antiseptic powder like nosophen, should be dusted along the edge of the nail, and the flesh crowded away from the nail by pushing in a little cotton with some tannic acid upon it.

If there is a raw surface about the border of the nail, powdered lead nitrate may be dusted upon it each morning for four or five days, till the ulcerated tissue shrinks away and the edge of the nail becomes visible. The toe should be covered with absorbent cotton and a bandage. As soon as the toe is really inflamed the case becomes surgical, and as such demands the care of a surgeon when one can be obtained.

FAINTING.

First Aid Rule 1.—*Remove impediments to respiration. Remove collar, loosen all waist bands and*

Suffocation

cords, unhook corset or cut the laces at person's back.

Rule 2.—Assist heart and brain with blood pressure. Put cushion under buttocks, wind skirt close about legs, and raise feet in air. Wait ten seconds.

Rule 3.—Aid respiration. Put mild smelling salts under nose. Spatter cold water in face.

SUFFOCATION FROM GAS IN WELLS, CISTERNs, OR MINES, OR FROM ILLUMINATING GAS.

First Aid Rule 1.—Remove quickly into pure air.

Rule 2.—Resuscitate as if drowned. Open his mouth, grasp his tongue, pull it forward and keep it there. Let another assistant grasp the arms just below the elbows, and draw them steadily upward by the sides of the patient's head to the ground the hands nearly meeting, which enlarges the capacity of the chest and induces inspiration. (See pp. 30 and 31.) While this is being done, let a third assistant take position astride the patient's hips with his elbows resting on his own knees, his hands extended ready for action. Next, let the assistant standing at the head turn down the patient's arms to the sides of his body, the assistant holding the tongue, changing hands if necessary to let the arms pass.

Just before the patient's hands reach the ground, the man astride the body will grasp the body with his hands, the ball of the thumb resting on either side of

Winslow and Ferris

the pit of the stomach, the fingers falling into the grooves between the short ribs. Now, using his knees as a pivot, he will, at the moment the patient's hands touch the ground, throw (not too suddenly) his whole weight forward on his hands, and at the same time squeeze the waist between them, as if he wished to force something in the chest upward out of the mouth; he will deepen the pressure while he slowly counts one, two, three, four (about five seconds), then suddenly lets go with a final push, which will send him back to his first position. This completes expiration. A child or a delicate person must be more gently handled.

At the instant of letting go, the man at the head of the patient will again draw the arms steadily upward, to the sides of the patient's head, as before (the assistant holding the tongue again, changing hands if necessary to let the arms pass, holding them there while he slowly counts one, two, three, four (about five seconds)).

Repeat these movements deliberately and perseveringly twelve or fifteen times in every minute, thus imitating the natural motions of breathing. Continue the artificial respiration from one to four hours, or until the patient breathes; and for a while after the appearance of returning life, carefully aid the first short gasps until deepened into full breaths.

Keep the body warm with hot-water bottles and blanket.

Rule 3.—Give oxygen to breathe from a cylinder,

Fit

for two days, at short intervals, in the case of, illuminating gas.

FIT; CONVULSION.

First Aid Rule 1.—Aid breathing. Loosen collar, waist bands, and unhook corset, or cut the laces behind.

Rule 2.—Protect from injury. Gently restrain from falling or rolling against furniture; lay flat on bed.

Rule 3.—Protect tongue from being bitten. Open jaws and put between teeth rubber eraser tied to stout string, or rubber stopper tied to stout string.

Rule 4.—Crush pearl of amyl nitrite in handkerchief, and hold close to patient's nose and mouth, till face is red and patient relaxes.

Rule 5.—Let patient sleep after fit without rousing.

Part II

GERM DISEASES

BY

KENELM WINSLOW



CHAPTER I

Contagious Diseases

Scarlet Fever—Symptoms and Treatment—Precautions Necessary—Measles—Communicating the Disease—Smallpox—Vaccination—How to Diagnose Chickenpox.

ERUPTIVE CONTAGIOUS FEVERS (*including Scarlet Fever, Measles, German Measles, Smallpox, and Chickenpox*).—These, with the exception of smallpox, attack children more commonly than adults. As they all begin with fever, and the characteristic rash does not appear for from one to four days after the beginning of the sickness, the diagnosis of these diseases must always be at the onset a matter of doubt. For this reason it is wise to keep any child with a fever isolated, even if the trouble seems to be due to “a cold” or to digestive disturbance, to avoid possible communication of the disorder to other children. While colds and indigestion are among the most frequent ailments of children, they must not be neglected, for measles begins as a bad cold, smallpox like the *grippe*, and scarlet fever with a sore throat or tonsillitis, and vomiting.

By isolation is meant that the sick child should stay in a room by himself, and the doors should be kept

Scarlet Fever

closed and no children should enter, nor should any objects in the room be removed to other parts of the house after the beginning of its occupation by the patient.

The services of a physician are particularly desirable in all these diseases, in order that an early diagnosis be made and measures be taken to protect the family, neighbors, and community from contagion. The failure of parents or guardians to secure medical aid for children is regarded by the law as criminal neglect, and is subject to punishment. Boards of health require the reporting of all contagious diseases as soon as their presence is known, and failure to comply with their rules also renders the offender liable to fine or imprisonment in most places.

SCARLET FEVER (*Scarlatina*).—There is no difference between scarlet fever and scarlatina. It is a popular mistake that the latter is a mild type of scarlet fever. Fever, sore throat, and a bright-red rash are the characteristics of this disease. It occurs most frequently in children between the ages of two and six years. It is practically unknown under one year of age. Prof. H. M. Biggs, of the New York Department of Health, has seen but two undoubted cases in infants under twelve months. It is rare in adults, and one attack usually protects the patient from another. Second attacks have occurred, but many such are more apparent than real, since an error in diagnosis is not uncommon. The disease is communi-

cated chiefly by means of the scales of skin which escape during the peeling process, but may also be acquired at any time from the onset of the attack from the breath, urine, and discharges from the body; or from substances which have come in contact with these emanations. Scarlet fever is probably a germ disease, and the germs may live for weeks in toys, books, letters, clothing, wall paper, etc. Close contact with the patient, or with objects which have come in close touch with the patient, is apparently necessary for contagion.

Period of Development.—After exposure to the germs of scarlet fever, usually from two to five days elapse before the disease shows itself. Occasionally the outbreak of the disease occurs within twenty-four hours of exposure, and rarely is delayed for a week or ten days.

Symptoms.—The onset is usually sudden. It begins with vomiting (in very young children sometimes convulsions), sore throat, fever, chilliness, and headache. The tongue is furred. The patient is often stupid; or may be restless and delirious. Within twenty-four hours or so the rash appears—first on the neck, chest, or lower part of back—and rapidly spreads over the trunk, and by the end of forty-eight hours covers the legs and entire body excepting the face, which may be simply flushed. The rash appears as fine, scarlet pin points scattered over a background of flushed skin. At its fullest development, at the end of the second or third day, the whole body may present

Scarlet Fever

the color of a boiled lobster. After this time the rash generally fades away and disappears within five to seven days. It is likely to vary much in intensity while it lasts. As the rash fades, scaling of the skin begins in large flakes and continues from ten days to as many weeks, usually terminating by the end of the sixth to eighth week. One of the notable features is the appearance of the tongue, at first showing red points through a white coating, and after this has cleared away, in presenting a raspberry-like aspect. The throat is generally deep red, and the tonsils may be dotted over with white spots (see Tonsilitis) or covered with a whitish or gray membrane suggesting diphtheria, which occasionally complicates scarlet fever. The fever usually is high (103° to 107° F.), and the pulse ranges from 120 to 150; both declining after the rash is fully developed, generally by the fourth day. The urine is scanty and dark. There is, however, great variation in the symptoms as to their presence or absence, intensity, and time of occurrence and disappearance.

Complications and Sequels.—These are frequent and make scarlet fever the most dreaded of the eruptive diseases, except smallpox. Enlarged glands under the jaw and at the sides of the neck are common, and appear as lumps in these sites. Usually not serious, they may enlarge and threaten life. Pain and swelling in the joints, especially of the elbows and knees, are not rare, and may be the precursors of serious inflam-

mation of these parts. One of the most frequent and serious complications of scarlet fever is inflammation of the kidneys, occurring more often toward the end of the second week of the disease. Examination of the urine by the attending physician at frequent intervals throughout the course of the disorder is essential, although puffiness of the eyelids and face, and of the feet, ankles, and hands, together with lessened secretion of urine—which often becomes of a dark and smoky hue—may denote the onset of this complication. The disease of the kidneys usually results in recovery, but occasionally in death or in chronic Bright's disease of these organs. Inflammation of the middle ear with abscess, discharge of matter from the ear externally, and—as the final outcome—deafness, is not uncommon. This complication may be prevented to a considerable extent by spraying the nose and throat frequently and by the patient's use of a nightcap with earlaps, if the room is not sufficiently warm. Inflammation of the eyelids is an occasional complication. The heart is sometimes attacked by the toxins of the disease, and permanent damage to the organ, in the form of valvular trouble, may result. Blindness and nervous disorders are among the rarer sequels including paralyses and St. Vitus's dance.

Determination of Scarlet Fever.—When beginning with vomiting, headache, high fever, and sore throat, and followed in twenty-four hours with a general scarlet rash, this is not difficult; but occasionally

Scarlet Fever

other diseases present rashes, as indigestion, *grippe*, and German measles, which puzzle the most acute physicians. Measles may be distinguished from scarlet fever in that measles appears first on the face, the rash is patchy or blotchy, and does not show for three to four days after the beginning of the sickness. The patient seems to have a bad cold, with cough, running at the nose, and sore eyes. German measles is mild, and while the rash may look something like that of scarlet fever, the patient does not seem generally ill, is hardly affected at all, though rarely troubled with slight catarrh of the nose. In no sickness are the services of a physician more necessary than in scarlet fever; first, to determine the existence of the disease, and then to prevent or combat the complications which often approach insidiously.

Outlook.—The average death rate of scarlet fever is about ten per cent. It is very fatal in children about a year old, and most of the deaths occur in those under the age of six. But the mortality varies greatly at different times and in different epidemics. In 1904-5, in many parts of the United States, the disease was very prevalent and correspondingly mild, and deaths were rare.

Duration of Contagion.—The disease is commonly considered contagious only so long as peeling of the skin lasts. But it seems probable that any catarrhal secretion from the nose, throat, or ear is capable of communicating the germs from a patient to another

person for many days after other evidences of the disease are past. Scarlet fever patients should always be isolated for as long a period as six weeks—and better eight weeks—without regard to any shorter duration of peeling, and if peeling continues longer, so should the isolation.

Treatment.—In case a physician is unobtainable the patient must be put to bed in the most airy, sunshiny room, which should be heated to 70° F., and from which all the unnecessary movables should be taken out before the entrance of the patient. A flannel nightgown and light bed clothing are desirable. The fever is best overcome by cold sponging, which at the same time diminishes the nervous symptoms, such as restlessness and delirium. The body is sponged—part at a time—with water at the temperature of about 70° F., after placing a single thickness of old cotton or linen wet with ice or cold water (better an ice cap) over the forehead. The part is thoroughly dried as soon as sponged, and the process is repeated whenever the temperature is over 103° F. There need be no fear that the patient may catch cold if only a portion of the body is exposed at any one time. If there is any chilliness following sponging, a bag or bottle containing hot water may be placed at the feet. It is well that a rubber bag containing ice, or failing this a cold cloth, be kept continually on the head while fever lasts. The throat should be sprayed hourly with a solution of hydrogen peroxide (full strength) and the nose with

Measles

the same, diluted with an equal amount of water, three times a day. The outside of the throat it is wise to surround with an ice bag, or lacking this, a cold cloth frequently wet and covered with a piece of oil silk (or rubber) and flannel.

The diet should consist of milk, broths, or thin gruels, and plenty of water should be allowed. Sweet oil or carbolized vaseline should be rubbed over the whole body night and morning during the entire sickness and convalescence. The bowels must be kept regular by injections or mild cathartics, and, after the fever subsides, vegetables, fruit, cereals, and milk may be permitted, together with meat or eggs once daily. It is imperative for the nurse and also the mother to wear a gown and cap over the outside clothes, to be slipped off in the hall at the door of the sick room when leaving the latter.

MEASLES.—Measles is a contagious disease, characterized by a preliminary stage of fever and catarrh of the eyes, nose, and throat, and followed by a general eruption on the skin. One attack practically protects a person from another, yet, on the other hand, second attacks occur with extreme rarity. It is more contagious than scarlet fever, and isolation of a patient in a house is of less service in preventing communication to other inmates, whereas in scarlet fever half the number of susceptible children may escape the disease through this precaution. The germs which cause measles perish rapidly, so that infected clothes

or other objects merely require a thorough airing to be rendered safe, whereas in scarlet fever the danger of transmission of the contagion may lurk in infected clothing and other substances for weeks, unless they are subjected to proper disinfection. A patient with measles is capable of communicating the disorder from its onset, before the appearance of the rash, through the breath, discharges from the nose and eyes, tears and saliva and all the secretions. At the end of the third week of the disease the patient is usually incapable of giving the disease to others. Close contact with a patient is commonly necessary for one to acquire the disease, but it is frequently claimed that it is carried by a third person in the clothes, as by a nurse. It is infrequent in infants under six months, and most frequent between the second and sixth year. Adults are attacked by measles more often than by scarlet fever.

Development.—A period of from seven to sixteen days after exposure to measles elapses before the disease becomes apparent.

Symptoms.—The disease begins like a severe nasal catarrh with fever. The eyes are red and watery, the nose runs, and the throat is irritable, red, and sore, and there is some cough, with chilliness and muscular soreness. The fever, higher at night, varies from 102° to 104° F., and the pulse ranges from 100 to 120. There is often marked drowsiness for a day or two before the rash appears. Coated tongue, loss of appe-

Measles

tite, occasional vomiting, and thirst are present during this period. The appearance of minute, whitish spots, surrounded by a red zone, may often be seen in the inside of the mouth opposite the back teeth for some days before the eruption occurs.

The preliminary period, when the patient seems to be suffering with a bad cold, lasts for four days usually, and on the evening of the fourth day the rash breaks out. It first appears on the face and then spreads to the chest, trunk, and limbs. Two days are generally required for the complete development of the rash; it remains thus in full bloom for about two days more, then begins to subside, fading completely in another two days—six days in all.

The rash appears as bright-red, slightly raised blotches on the face, which is generally somewhat swollen. The same rash extends to the abdomen, back, and limbs. Between the mottled, red rash may be seen the natural color of the skin. At this time the cough may be hoarse and incessant, and the eyes extremely sensitive to light. The fever and other symptoms abate when the rash subsides, and well-marked scaling of the skin occurs.

Complications and Sequels.—Severe bronchitis, pneumonia, croup, laryngitis, sore eyes, ear abscess and deafness, violent diarrhea, convulsions, and, as a late result, consumption sometimes accompany or follow measles. For the consideration of these disorders, see special articles in other parts of this work.

Outlook.—The vast majority of healthy patients over two years old recover from measles completely. Younger children, or those suffering from other diseases, may die through some of the complications affecting the lungs. The disease is peculiarly fatal in some epidemics occurring among those living in unhygienic surroundings, and in communities unaccustomed to the ravages of measles. Thus, in an epidemic attacking the Fiji Islanders, over one-quarter of the whole population (150,000) died of measles in 1875. Measles is more severe in adults than in children.

Diagnosis.—For one not familiar with the characteristic rash a written description of it will not suffice for the certain recognition of the disease, but if the long preliminary period of catarrh and fever, and the appearance of the eruption on the fourth day, be taken into account—together with the existence of sore eyes and hoarse, hard cough—the determination of the presence of measles will not be difficult in most cases.

Treatment.—The patient should be put to bed in a darkened, well-ventilated room at a temperature of 68° to 70° F. While by isolation of the patient we may often fail to prevent the occurrence of measles in other susceptible persons in the same house, because of the very infectious character of the disease, and because it is probable that they have already been exposed during the early stages when measles was not suspected, yet all possible precautions should be adopted promptly. For this reason other children in the house should be

Measles

kept from school and away from their companions, and they ought not to be sent away from home to spread the disease elsewhere. The bowels should be kept regular by soapsuds injections or by mild cathartics, as a Seidlitz powder. If the fever is over 103° F. and is accompanied by much distress and restlessness, children may be sponged with tepid water, and adults with water at 80° F., every two hours or so as directed under scarlet fever. When cough is incessant or the rash does not come out well, there is nothing better than the hot pack.

The patient is stripped and wrapped from feet to neck in a blanket wrung out of hot water containing two teaspoonfuls of mustard stirred into a gallon of water. This is then covered with two dry blankets and the patient allowed to remain in the blankets for two or three hours, when the application may be repeated. It is well to keep a cold cloth on the head during the process. Cough is also relieved by a mixture containing syrup of ipecac, twenty drops; pargoric, one teaspoonful, for an adult (or one-third the dose for a child of six), which should be given in one-quarter glass of water and may be repeated every two hours. If there is hoarseness, the neck should be rubbed with a mixture of sweet oil, two parts; and oil of turpentine, one part, and covered with a flannel bandage. The cough mixture will tend to relieve this condition also. A solution of boric acid (ten grains of boric acid to the ounce of

water) is to be dropped in both eyes every two hours with a medicine dropper. Although usually mild, the eye symptoms may be very severe and require special treatment, and considerably impaired vision may be the ultimate result. Severe diarrhea is combated with bismuth subnitrate, one-quarter teaspoonful, every three hours. For adults, the diet consists of milk, broths, gruels, and raw eggs. Young children living on milk mixtures should receive the mixture to which they are accustomed, diluted one-half with barley water. Nourishment must be given every two hours except during sleep. The patient should be ten days in bed, and should remain three days in his room after getting up (or three weeks in all, if there are others who may contract measles in the house), and after leaving his room should stay in the house a week longer. The principal danger after an attack of measles is of lung trouble—pneumonia or tuberculosis (consumption)—and the greatest care should be exercised to avoid exposure to the wet or to cold draughts.

GERMAN MEASLES (*Rötheln*).—German measles is related neither to measles nor scarlet fever, but resembles them both to a certain extent—more closely the former in most cases. It is a distinct disease, and persons who have had both measles and scarlet fever are still susceptible to German measles. One attack of German measles usually protects the patient from another. Adults, who have not been previously attacked, are almost as liable to German measles as children, but

German Measles

it is rare that infants acquire the disease. It is a very contagious disorder—but not so much so as true measles—and often occurs in widespread epidemics. The breath and emanations from the skin transmit the *contagium* from the appearance of the first symptom to the disappearance of the eruption.

Development.—The period elapsing after exposure to German measles and before the appearance of the symptoms varies greatly—usually about two weeks; it may vary from five to eighteen days.

Symptoms.—The rash may be the first sign of the disease and more frequently is so in children. In others, for a day or two preceding the eruption, there may be headache, soreness, and redness of the throat, the appearance of red spots on the upper surface of the back of the mouth, chilliness, soreness in the muscles, loss of appetite, watering of the eyes. Catarrhal symptoms are most generally absent, an important point in diagnosis. When present, they are always mild. These preliminary symptoms, if present, are much milder and of shorter duration than in measles, where they last for four days before the rash appears; and the hard, persistent cough of measles is absent in German measles. Also, while there is sore throat in the latter, there is not the severe form with swollen tonsils covered with white spots so often seen in scarlet fever. Fever is sometimes absent in German measles; usually it ranges about 100° F., rarely over 102° F. Thus, German measles differs markedly from both scarlet

fever and measles proper. The rash usually appears first on the face, then on the chest, and finally covers the whole body, in the space of a few hours—twenty-four hours at most. The eruption takes the form of rose-red, round or oval, slightly raised spots—from the size of a pin head to that of a pea—sometimes running together into uniform redness, as in scarlet fever. The rash remains fully developed for about two days, and often changes into a coppery hue as it gradually fades away. There are often lumps—enlarged glands—to be felt under the jaw, on the sides and back of the neck, which occur more commonly in German than in true measles. The glands at the back of the neck are the most characteristic. They are enlarged in about two-thirds of the cases.

Determination.—The diagnosis or determination of the existence of measles must be made, in the absence of a physician, on the general symptoms rather than on the rash, which requires experience for its recognition and is subject to great variations in appearance, at one time simulating measles, at another scarlet fever.

German measles differs from true measles in the following points: the preliminary period—before the rash—is mild, short, or absent; fever is mild or absent; the cold in the nose and eyes and cough are slight or may be absent, as contrasted with these symptoms in measles, while the enlarged glands in the neck are more pronounced than in measles. The onset of German

Smallpox

measles is not so sudden as in scarlet fever and not accompanied with vomiting as in the latter, while the sore throat and fever are much milder in German measles. The peeling, which is so prominent in scarlet fever with the disappearance of the rash, is not infrequently present. It may be absent. Its presence or absence seems to depend upon the severity of the eruption. The desquamation when present is finer than in either measles or scarlet fever.

Outlook.—Recovery from German measles is the invariable rule, and without complications or delay.

Treatment.—Little or no treatment is required. The patient should remain in bed in a darkened room on a liquid diet while fever lasts, and be isolated from others indoors until all signs of the eruption are passed. The eyes should be treated with boric acid as in measles; the diet, during the fever, consisting of milk, broths, thin cereals, beef juice, raw eggs or egg-nog, for adults and older children; while infants should have their milk mixture diluted one-half with barley water. A bath and fresh clothing for the patient, and thorough cleansing and airing of the sick room and clothing are usually sufficient after the passing of the disease without chemical disinfection.

SMALLPOX.—Smallpox is one of the most contagious diseases known. It is extremely rare for anyone exposed to the disease to escape its onslaught unless previously protected by vaccination or by a former attack of the disease. One is absolutely safe from

acquiring smallpox if recently and successfully vaccinated, and thus has one of the most frightful and fatal scourges to which mankind has ever been subject been robbed of its dangers. The *contagium* is probably derived entirely from the scales and particles of skin escaping from smallpox patients, and in the year 1905-6 the true germ of the disease was discovered by Councilman, of Boston. It is not necessary to come in direct contact with a patient to contract the disease, as the *contagium* may be transmitted some little distance through the air, possibly even outside of the sick room. One attack almost invariably protects against another. All ages are liable to smallpox; it is particularly fatal in young children, and during certain epidemics has proved more so in colored than in white people.

Development.—A period of ten or twelve days usually elapses after exposure to smallpox before the appearance of the first symptoms of the disease. This period may vary, however, from nine to fifteen days.

Symptoms.—There is a preliminary period of from twenty-four to forty-eight hours after the beginning of the disease before an eruption occurs. The onset is ushered in by a set of symptoms simulating those seen in severe *grippe*, for which smallpox is often mistaken at this time. The patient is suddenly seized with a chill, severe pains in the head, back, and limbs, loss of appetite and vomiting, dizziness on sitting up, and fever— 103° to 105° F. In young children convul-

Smallpox

sions often take the place of the chill seen in adults. On the second day a rash often appears on the lower part of the belly, thighs, and armpits, which may resemble that characteristic of measles or scarlet fever, but does not last for over a day or two. It is very evanescent and, consequently, rarely seen. Diarrhea often occurs, as well as vomiting, particularly in children. On the evening of the fourth day the true eruption usually appears; first on the forehead or face, and then on the arms, hands, and legs, palms, and soles. The eruption takes successively four forms: first, red, feeling like hard pimples or like shot; then, on the second or third day of the eruption, these pimples become tipped with little blisters with depressed centers, and surrounded by a red blush. Two or three days later the blisters are filled with "matter" or pus and present a yellowish appearance and are rounded on top. Finally, on about the tenth day of the eruption, the pustules dry up and the matter exudes, forming large, yellowish or brownish crusts, which, after a while, drop off and leave red marks and, in severe cases, pitting. The fever preceding the eruption often disappears upon the appearance of the latter and in mild cases does not reappear, but in severe forms the temperature remains about 100° F., and when the eruption is at its height again mounts to 103° to 105° F., and gradually falls with convalescence. The eruption is most marked on the face, hands, and forearms, and occurs less thickly on the body. It appears also in the mouth and throat and

when fully developed on the face gives rise to pain and considerable swelling and distortion of the features, so that the eyes are closed and the patient becomes frightfully disfigured and well-nigh unrecognizable. Delirium is common at this time, and patients need constant watching to prevent their escape from bed. In the severe forms the separate eruptive points run together so that the face and hands present one distorted mass of soreness, swelling, and crusting. In these, pitting invariably follows, while in those cases where the eruption remains distinct, pitting is not certain to occur. A still worse form is that styled "black small-pox," in which the skin becomes of a dark-purplish hue, from the fact that each pustule is a small blood blister, and bleeding occurs from the nose, mouth, etc. These cases are almost, without exception, fatal in five to six days.

The patient may say that the eruption was the first symptom he observed. This was particularly noticed in negroes, many of whom had never been vaccinated. The eruption may exhibit but a dozen or so points, especially about the forehead, wrists, palms, and soles. After the first four days the fever and all the disagreeable symptoms may subside, and the patient may feel absolutely well. The eruption, however, passes through the stages mentioned, although but half the time may be occupied by the changes; five or six days instead of ten to twelve for crusts to form. In such cases the death rate has been exceedingly low, al-

Smallpox

though it is perfectly possible for a person to contract the most severe smallpox from one of these mild (and often unrecognized) cases, as has unfortunately happened. Smallpox occurring after successful vaccination resembles, in its characteristics, the cases just described, and unless vaccination had been done many years previously, the results are almost always favorable as regards life and absence of pitting.

Detection.—Smallpox is often mistaken for chickenpox, or some of the skin diseases, in its mild forms. The reader is referred to the article on chickenpox for a consideration of this matter. The mild type should be treated just as rigidly as severe cases with regard to isolation and quarantine, being more dangerous to the community because lightly judged and not stimulating to the adoption of necessary precautions. The preliminary fever and other symptoms peculiar to smallpox will generally serve to determine the true nature of the disease, since these do not occur in simple eruptions on the skin. The general symptoms and course of smallpox must guide the layman rather than the appearance of the eruption, which requires educated skill and experience to recognize. Chickenpox in an adult is less common than in children. Smallpox is very rare in one who has suffered from a previous attack of the disease or in one who has been successfully vaccinated within a few years.

Outlook.—The death rate of smallpox in those who have been previously vaccinated at a compara-

tively recent date, or in varioloid, as it is called when thus modified by vaccination, is only 1.2 per cent. There are, however, severe cases following vaccinations done many years previous to the attack of smallpox. While these cannot be called varioloid, yet the death rate is much lower than in smallpox occurring in the unvaccinated. Thus, before the mild epidemic of 1894 the death rate in the vaccinated was sixteen per cent; since 1894 it has been only seven per cent; while in the unvaccinated before 1894 it was fifty-eight per cent; and since that date it has been but seventeen per cent, as reported by Welch from the statistics of 5,000 cases in the Philadelphia Municipal Hospital.

Complications.—While a variety of disorders may follow in the course of smallpox, complications are not very frequent in even severe cases. Inflammation of the eyelids is very common, however, and also boils in the later stages. Delirium and convulsions in children are also frequent, as well as diarrhea; but these may almost be regarded as natural accompaniments of the disease. Among the less common complications are: laryngitis, pneumonia, diseases of the heart, insanity, paralysis, various skin eruptions, inflammation of the joints and of the eyes and ears, and baldness.

Treatment.—Prevention is of greatest importance. Vaccination stands alone as the most effective preventive measure in smallpox, and as such has no rival in the whole domain of medicine. The modern method includes the inoculation of a human being with matter

Smallpox

taken from one of the eruptive points on the body of a calf suffering with cowpox. Whether cowpox is a modified form of smallpox or a distinct disease is unknown.

The period of protection afforded by a successful vaccination is uncertain, because it varies with different individuals. In a general way immunity for about four or five years is thus secured; ten or twelve years after vaccination the protection is certainly lost and smallpox may be then acquired. Every individual should be vaccinated between the second and third month after birth, and between the ages of ten and twelve, and at other times whenever an epidemic threatens. An unvaccinated person should be vaccinated and revaccinated, until the result is successful, as immunity to vaccination in an unvaccinated person is practically unknown. When unsuccessful, the vaccine matter or the technique is faulty. A person continuously exposed to smallpox should be vaccinated every few weeks—if unsuccessful, no harm or suffering follow; if successful, it proves liability to smallpox. A person previously vaccinated successfully may “take” again at any time after four or five years, and, in event of possible exposure to smallpox, should be revaccinated several times within a few weeks—if the vaccination does not “take”—before the attempt is given up. An unvaccinated person, who has been exposed to smallpox, can often escape the disease if successfully vaccinated within

three days from the date of the exposure, but is not sure to do so.

Diseases are not introduced with vaccination now that the vaccine matter is taken from calves and not from the human being, as formerly. Most of the trouble and inflammation of the vaccinated part following vaccination may be avoided by cleanliness and proper care in vaccinating.

In the absence of a physician, vaccination may be properly done by any intelligent person when the circumstances demand it. Vaccination is usually performed upon the outside of the arm, a few inches below the shoulder, in the depression situated in that region. If done on the leg, the vaccination is apt to be much more troublesome and may confine the patient to bed. The arm should be thoroughly washed in soap and warm water, from shoulder to elbow, and then in alcohol diluted one-third with water. When this has evaporated (without rubbing), the dry arm is scratched lightly with a cold needle which has previously been held in a flame and its point heated red hot. The point must thereafter not be touched with anything until the skin is scratched with it. The object is not to draw blood, but to remove the outer layer of skin, over an area about one-fourth of an inch square, so that it appears red and moist but not bleeding. This is accomplished by very light scratching in various directions. Another spot, about an inch or two below, may be similarly treated. Then vaccine matter, if

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liquid, is squirted on the raw spots, or, if dried on points, the ivory point is dipped in water which has been boiled and cooled, and rubbed thoroughly over the raw places. The arm must remain bare and the vaccination mark untouched until the surface of the raw spot is perfectly dry, which may take half an hour. A piece of sterilized surgical gauze, reaching halfway about the arm and kept in place with strips of adhesive plaster (or an absolutely clean handkerchief bound about the arm, and held by sewing or safety pins), ought to cover the vaccination for three days. After this time the sore must only come in contact with soft and clean old cotton or linen, which may be daily pinned in the sleeve of the under garment. If the scab is knocked off and an open sore results it should be treated like any wound.

If the vaccination "takes," it passes through several stages. On the third day following vaccination a red pimple forms at the point of introduction of the matter, which is surrounded by a circle of redness. Some little fever may occur. On the fifth day a blister or pimple containing clear fluid with a depressed center is seen, and a certain amount of hard swelling, itchiness, and pain is present about the vaccination. A sore lump (gland) is often felt under the arm. The full development is reached by the eighth day, when the pimple is full and rounded and contains "matter," and is surrounded by a large area of redness. From the eleventh day the vaccination sore

dries, and a brown scab forms over it about the end of the fourteenth day, and the redness and swelling gradually depart. At the end of about three weeks the scab drops off, leaving a pitted scar or mark. Not infrequently the vaccination results in a very slight pimple and redness, which passes through the various stages described, in a week or ten days, in which case the vaccination should be repeated. Unless the vaccination follows very closely the course described, it cannot be regarded as successful, although after the first one or two vaccinations the result is often not so severe, and the time of completion of the various stages somewhat shortened.

Rarely an eruption, resembling that at the vaccination site, appears on the vaccinated limb and even becomes general upon the body, due to urticaria or to inoculation, through scratching.

The special treatment of an attack of smallpox is largely a matter of careful nursing. A physician or nurse can scarcely lay claim to any great degree of heroism in caring for smallpox patients, as there is no danger of contracting the disease providing a successful vaccination has been recently performed upon them. The patient should be quarantined in an isolated building, and all unnecessary articles should be removed from the sick room, in the way of carpets and other furnishings. It is well that the room be darkened to save irritation of the eyes. The diet should be liquid: milk, broths, and gruels. *Lauda-*

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num, fifteen drops, or paregoric, one tablespoonful in water, may be given to adults, once in three hours, to relieve pain during the first few days. Sponging throughout the course of the disease is essential; first, with cool water, as directed for scarlet fever, with the use of cold on the head to relieve the itching, fever, and delirium. The cold pack is still more efficient. To give this, the patient is wrapped in a sheet wrung out in water at a temperature between 68° and 75° F. The sheet surrounds the naked body from feet to neck, and is tucked between the legs and between the body and arms; the whole is then covered with a dry blanket, and a cold, wet cloth or ice cap is placed upon the head. The patient may be permitted to remain in the pack for an hour, when it may be renewed, if necessary, to allay fever and restlessness; otherwise it may be discontinued. The cold sponging or cold pack are indicated when the temperature is over 102.5° F., and when with fever there are restlessness and delirium. Great cleanliness is important throughout the disease; the bedclothes should be changed daily and the patient sponged two or three times daily with warm water, unless fever is high. Cloths wet with cold carbolic-acid solution (one-half teaspoonful to the pint of hot water) should be kept continuously on the face and hands. Holes are cut in the face mask for the eyes, nose, and mouth, and the whole covered with a similar piece of oil silk to keep in the moisture. Such applications give much

relief, and to some extent prevent pitting. The hair must be cut short, and crusts on the scalp treated with frequent sponging and applications of carbolized vaseline, to soften them and hasten their falling. The boric-acid solution should be dropped into the eyes as recommended for measles, and the throat sprayed every few hours with Dobell's solution. Diarrhea in adults may be checked with teaspoonful doses of paregoric given hourly in water. Vaseline and cloths used on a patient must not be employed on another, as boils are thus readily propagated. All clothing, dishes, etc., coming in contact with a patient must be boiled, or soaked in a two-per cent. carbolic-acid solution for twenty-four hours, or burned. When the patient is entirely free from scabs, after bathing and putting on disinfected or new clothes outside of the sick room, he is fit to reënter the world.

CHICKENPOX.—Chickenpox is a contagious disease, chiefly attacking children. While it resembles smallpox in some respects, at times simulating the latter so closely as to puzzle physicians, it is a distinct disease and is in no way related to smallpox. This is shown by the fact that chickenpox sometimes attacks a patient suffering with, or recovering from, smallpox. Neither do vaccination nor a previous attack of smallpox protect an individual from chickenpox. Chickenpox is not common in adults, and its apparent presence in a grown person should awaken the liveliest suspicion lest the case be one of smallpox,

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since this mistake has been frequently made, and with disastrous results, during an epidemic of mild smallpox. One attack of chickenpox usually protects against another, but two or three attacks in the same individual are not unknown. The disease may be transmitted from the patient to another person from the time of the first symptom until the disappearance of the eruption. The disease ordinarily occurs in epidemics, but occasionally in isolated cases.

Development.—A period of two weeks commonly elapses after exposure to the disease before the appearance of the first symptom of chickenpox, but this period may vary from thirteen to twenty-one days.

Symptoms.—The characteristic eruption is often the first warning of chickenpox, but in some cases there may be a preliminary period of discomfort, lasting for a few hours, before the appearance of the rash; particularly in adults, in whom the premonitory symptoms may be quite severe. Thus, there may be chilliness, nausea, and even vomiting, rarely convulsions in infants, pain in the head and limbs, and slight fever (99° to 102° F.) at this time. The eruption shows first on the body, in most cases, especially the back. It consists of small red pimples, which rapidly develop into pearly looking blisters about as large as a pea to that of the finger nail, and are sometimes surrounded by a red blush on the skin. These blisters vary in number, from a dozen or so to two hundred. They do not run together, and in three to four days dry up, be-

come shriveled and puckered, and covered with a dark-brown or blackish crust, and drop off, leaving only temporary red spots in most cases. The fever usually continues during the eruption. During the first few days successive fresh crops of fresh pimples and blisters appear, so that while the first crop is drying the next may be in full development. This forms one of its distinguishing features when chickenpox is compared with smallpox. In chickenpox the eruption is seen on the unexposed skin chiefly, but may occur on the scalp and forehead, and even on the palms, soles, forearms, and face. In many cases the eruption is found in the mouth, on its roof, and the inside of the cheeks. The blisters rarely contain "matter" or pus, as in smallpox, unless they are scratched. Scratching may lead to the formation of ugly scars and should be prevented, especially when the eruption is on the face. Pitting rarely occurs.

Determination.—The discrimination between chickenpox and smallpox is sometimes extremely puzzling and demands the skill of an experienced physician. When one is unavailable, the following points may serve to distinguish the two disorders: smallpox usually begins like a severe attack of *grippe*, with pain in the back and head, general pains and nausea or vomiting, with high fever (103° to 104° F.) These last two or three days, and may completely subside when the rash appears. In chickenpox preliminary discomfort is absent, or lasts but a few hours before

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the eruption. The eruption of smallpox usually occurs first on the forehead, near the hair, or on the palms of the hands, soles of the feet, the arms and legs, but is usually sparse on the body. The eruption appears about the same time in smallpox and not in successive crops, as in chickenpox. Chickenpox is more commonly a disease of childhood; smallpox attacks all ages. The crusts in chickenpox are thin, and appear in four or five days, while those of smallpox are large and yellow, and occur after ten or twelve days.

Outlook.—Chickenpox almost invariably results in a rapid and speedy recovery without complications or sequels. The young patients often feel well throughout the attack, which lasts from eight to twelve days.

Treatment.—Children should be kept in bed during the eruptive stage until the blisters have dried. To prevent scratching, the calamine lotion may be used (Vol. II, p. 145), or carbolized vaseline, or bathing with a solution of baking soda, one teaspoonful to the pint of tepid water. The diet should be that recommended for German measles. Patients should be kept in the house and isolated until all signs of the eruption are passed, and then receive a good bath and fresh clothing before mingling with others. The sick room should be thoroughly cleaned and aired; thorough chemical disinfection is not essential.

The services of a physician are always desirable in order that it may be positively determined that the disease is not a mild form of smallpox.

CHAPTER II

Infectious Diseases

Typhoid Fever—How it is Contracted—Complications and Sequels—Rest, Diet, and Bathing the Requisites—Mumps—Whooping Cough—Erysipelas.

TYPHOID FEVER (ENTERIC FEVER).—

Through ignorance which prevailed before the discovery of the germ of typhoid fever and exact methods for determining the presence of the same, the term was loosely applied and is to this day. Thus mild forms of typhoid are called gastric fever, slow fever, malarial fever, nervous fever, etc., all true typhoid in most cases; while typhoid fever, common to certain localities and differing in some respects from the typical form, is often named after the locality in which it occurs, as the "mountain fever" common to the elevated regions of the western United States. This want of information is apt to prevail in regions remote from medical centers, and leads to neglect of the necessary strict measures for the protection of neighboring communities, for the excretion of one typhoid patient has led to thousands of cases and hundreds of deaths.

Typhoid fever is a communicable disease caused by a germ which attacks the intestines chiefly, but also invades the blood, and at times all the other parts of

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the body, and is characterized by continued fever, an eruption, tenderness and distention of the bowels, and generally diarrhea. It is common to all parts of the earth in the temperate zones, and occurs more frequently from July to December in the north temperate zone, from February to July in the south temperate zone. It is most prevalent in the late summer and autumn months and after a hot, dry summer. Individuals between the ages of fifteen and thirty are more prone to typhoid fever, but no age is exempt. The sexes are almost equally liable to the disease, although it is said that for every four female cases there are five male cases. The robust succumb as readily as the weak.

Cause and Modes of Communication.—While the typhoid germ is always the immediate cause, yet it is brought in contact with the body in various ways. Contamination of water supply through bad drainage is the principal source of epidemics of typhoid. Before carefully protected public water supplies were in vogue in Massachusetts, there were ninety-two deaths from typhoid fever in 100,000 inhabitants, while thirty-five years after town water supplies became the rule, there were only nineteen deaths for the same population. Whenever typhoid is prevalent, the water used for drinking and all other household purposes should be boiled, and uncooked food should be avoided. Flies are carriers of typhoid germs by lighting on the nose, the mouth, and the discharges of typhoid patients, and then conveying the germs to food, green vege-

tables, and milk. Cooking the food, preventing contact of flies with the patients, and keeping flies out of human habitations becomes imperative. Milk is a source of contagion through contaminated water used to wash cans, or to adulterate it, or through handling of it by patients or those who have come in contact with patients. Oysters growing in the mouths of rivers and near the outlets of drains and sewers are carriers of typhoid germs, and, if eaten raw, sometimes communicate typhoid fever. Dust is an occasional medium of communication of the germ. It is probable, however, that the germ always enters the body by being swallowed with food or drink, and does not enter through the lungs. There is little doubt on this point. Ice may harbor the germ for many months, for freezing does not kill it, and epidemics have been traced to this source. Clothing, wood, utensils, door handles, etc., which have been contaminated by contact with discharges from patients, may also prove mediums of communication of the typhoid germ to healthy individuals. Typhoid germs escape from patients sick with the disease chiefly in the bowel discharges and urine, sometimes in the sweat, saliva, and vomited matter.

Sewer gas and emanations from sewage and filth will not communicate typhoid fever directly, but the latter afford nutriment for the growth of the germ, and after becoming infected, may eventually come in contact with drinking water or food, and so prove dan-

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gerous. Improper care of discharges of excrement and urine—with the assistance of flies—are responsible for the enormous typhoid epidemics in military camps, so that in the late Spanish-American War one-fifth of all our soldiers in camp contracted the disease. In the upper layers of the soil typhoid germs may live for six months through frosts and thaws. The disease is preventable, and will probably be stamped out in time. In some of the most thickly populated cities in the world, as in Vienna, its occurrence is most infrequent, owing to intelligent sanitary control and pure water supply, while in the most salubrious country districts its inroads are the most serious and fatal through ignorance and carelessness.

Development.—From eight to twenty-three days elapse from the time of entrance of typhoid germs into the body before the patient is taken sick. One attack usually protects one against another, but two or three attacks are not unheard of in the same person.

Symptoms.—Typhoid fever is subject to infinite variations, and it will here be possible only to outline what may be called a typical case. In a work of this kind the preliminary symptoms are of most importance in warning one of the probability of an attack, so that the prospective patient can govern himself accordingly, as in no other disease is rest in bed of more value. Patients who persist in walking about with typhoid fever for the first week or so are most likely to die of the disease.

Kenelm Winslow

The average duration of the disease is about one month. During the first week the onset is gradual, the temperature mounting a little higher each day—as 99.5° F. the first evening, 101° the second, 102° the fourth, 104° the fifth, 105° the sixth, and 105.5° the seventh. In the morning of each day the temperature is usually about a degree or more lower than that of the previous night. From the end of the first week to the beginning of the third the temperature remains at its highest point, being about the same each evening and falling one or two degrees in the morning. During the third week the temperature gradually falls, the highest point each evening being a degree or so lower than the previous day, while in the fourth week the temperature may be below normal in the morning and a degree or so above normal at night. So much for this symptom. After the entrance of typhoid germs into the bowels and before the recognized onset of the disease, there may be lassitude and disinclination for exertion. The disease begins with headache, backache, loss of appetite, sometimes a chill in adults or a convulsion in children, soreness in the muscles, pains in the belly, nosebleed, occasional vomiting, diarrhea, coated tongue, often some cough, flushed face, pulse 100° , gradually increasing as described.

These symptoms are, to a considerable extent, characteristic of the beginning of many acute diseases, but the gradual onset with constant fever, nosebleed, and looseness of the bowels are the most sugges-

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tive features. Then, if at the end of the first week or ten days pink-red spots, about as large as a pin head, appear on the chest and belly to the number of two or three to a dozen, or very numerous, and disappear on pressure (only to return immediately), the existence of typhoid fever is pretty certain. Headache is now intense. These rose spots—as they are called—often appear in crops during the second and third weeks, lasting for a few days, then departing.

During the second week there is often delirium and wandering at night; the headache goes, but the patient is stupid and has a dusky, flushed face. The tongue becomes brownish in color, and its coat is cracked, and the teeth are covered with a brownish matter. The skin is generally red and the belly distended and tender. Diarrhea is often present with three to ten discharges daily of a light-yellow, pea-soup nature, with a very offensive odor. Constipation throughout the disease is, however, not uncommon in the more serious cases. The pulse ranges from 80 to 120 a minute.

During the third week, in cases of moderate severity, the general condition begins to improve with lowering of the temperature, clearing of the tongue, and less frequent bowel movements. But in severe cases the patient becomes weaker, with rapid, feeble pulse, ranging from 120 to 140; stupor and muttering delirium; twitching of the wrists and picking at the bed-clothes, with general trembling of the muscles in mov-

ing; slow, hesitating speech, and emaciation; while the urine and fæces may be passed unconsciously in bed. Occasionally the patient with delirium may require watching to prevent him from getting out of bed and injuring himself. He may appear insane.

During the fourth week, in favorable cases, the temperature falls to normal in the morning, the pulse is reduced to 80 or 100, the diarrhea ceases, and natural sleep returns.

Among the many and frequent variations from the type described, there may be a fever prolonged for five or six weeks, with a good recovery. Chills are not uncommon during the disease, sometimes owing to complications. Relapse, or a return of the fever and other symptoms all over again, occurs in about ten per cent of the cases. This may happen more than once, and as many as five relapses have been recorded in one patient. A slight return of the fever for a day or two is often seen, owing to error in diet, excitement, or other imprudence after apparent recovery. Death may occur at any time from the first week, owing to complications or the action of the poison of the disease. Pneumonia, perforation of and bleeding from the bowels are the most frequent dangerous complications. Unfavorable symptoms are continued high fever (105° to 106° F.), marked delirium, and trembling of the muscles in early stages, and bleeding from the bowels; also intense and sudden pain with vomiting, indicating perforation of the intestines. The result is more apt to prove un-

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favorable in very fat patients, and especially so in persons who have walked about until the fever has become pronounced. Bleeding from the bowels occurs in four to six per cent of all cases and is responsible for fifteen per cent of the deaths; perforation of the bowels happens in one to two per cent of all cases and occasions ten per cent of the deaths.

Detection.—It is impossible for the layman to determine the existence of typhoid fever in any given patient absolutely, but when the symptoms follow the general course indicated above, a probability becomes established. Unusual types are among the most difficult and puzzling cases which a physician has to diagnose, and he can rarely be absolutely sure of the nature of any case before the end of the first week or ten days, when examination of the blood offers an exact method of determining the presence of typhoid fever. Typhoid fever—especially where there are chills—is often thought to be malaria, when occurring in malarial regions, and may be improperly called “typhoid malaria.” There is no such disease. Rarely typhoid fever and malaria coexist in the same person, and while this was not uncommon in the soldiers returning from Cuba and Porto Rico, it is an extremely unusual occurrence in the United States. Examination of the blood will determine the presence or absence of both of these diseases.

Complications and Sequels.—These are very numerous. Among the former are diarrhea, delirium,

mental and nervous diseases, bronchitis, pleurisy, pneumonia, ear abscess, perforation of and hemorrhage from the bowels, inflammation of the gall bladder, disease of heart, kidney, and bladder, and many rarer conditions, depending upon the organ which the germ invades. Among sequels are boils, baldness, bone disease, painful spine, and, less commonly, insanity and consumption. While convalescence requires weeks and months, the patient often gains greatly in flesh and feels made over anew, as in fact he has been to a great extent, through the destruction and repair of his organs.

Outlook.—The death rate varies greatly in different epidemics and under different conditions. During the Spanish-American War in the enormous number of cases—over 20,000—the death rate was only about seven per cent, which represents that in the best hospitals of this country and in private practice. Osler states that the mortality ranges from five to twelve per cent in private practice, and from seven to twenty per cent in hospital practice, because hospital cases are usually advanced before admission. The chances of recovery are much greater in patients under fifteen years, and are also more favorable between the twenty-second and fortieth years.

Treatment.—There is perhaps no disease in which the services of a physician are more desirable or useful than in typhoid fever, on account of its prolonged course and the number of complications and incidents

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which may occur during its existence. It is the duty of the physician to report cases of typhoid to the health authorities, and thus act as a guardian of the public health. If, however, in any circumstances one should have the misfortune to have the care of a typhoid patient remote from medical aid, it is a consolation to know that the outlook is not greatly altered by medicine or special treatment of any sort. There have been epidemics in remote parts of this country where numbers of persons have suffered with typhoid without any professional care, and yet with surprisingly good results. Thus, in an epidemic occurring in a small community in Canada, twenty-four persons sickened with typhoid and received no medical care or treatment whatever, and yet there was but one death. The essentials of treatment are comprised in *Rest, Diet, and Bathing*. Rest to the extent of absolute quiet in the horizontal position, at the first suspicion of typhoid, is requisite in order to avoid the dangers of bleeding and perforation of the bowels resulting from ulceration of structures weakened by the disease. The patient should be assisted to turn in bed, must make no effort to rise during the sickness, and should pass urine and bowel discharges into a bedpan or urinal under cover. In case of bleeding from the bowels, the bedpan should not be used, but the discharges may be received for a time in cloths, without stirring the patient.

Diet.—This should consist chiefly of liquids until

a week after the fever's complete disappearance. A cup of liquid should be given every two hours except during a portion of the sleeping hours. Milk, diluted with an equal amount of water, forms the chief food in most cases unless it disagrees, is refused, or is unobtainable.

In addition to milk, albumen water—white of raw egg, strained and diluted with an equal amount of water, and flavored with a few drops of lemon juice or with brandy—is valuable; also juice squeezed from raw beef—in doses of four tablespoonfuls—coffee, cocoa, and strained barley, rice, or oatmeal gruel, broths, unless diarrhea is marked and increased by the same. Soft custard, jellies, ice cream, milk-and-flour porridge, and eggnog may be used to increase the variety. Finely scraped raw or rare beef, very soft toast, and soft-boiled or poached eggs are allowable after the first week of normal temperature, at the end of the third or fourth week of the disease, and during the course of the disease under circumstances where the fluids are not obtainable or not well borne. An abundance of water should be supplied to the patient throughout the disease.

Bathing.—The importance of cold, through the medium of water, in typhoid fever accomplishes much, both in reducing the temperature and in stimulating the nervous system and relieving restlessness and delirium. Bathing is usually applied when the temperature rises above 102.5° F., and may be repeated every

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two or three hours if restlessness, delirium, and high temperature require it.

The immersion of patients in tubs of cold water, as practiced with benefit in hospitals, is out of the question for use by inexperienced laymen. The patient should have a woven-wire spring bed and soft hair mattress, over which is laid a folded blanket covered by a rubber sheet. Sponging the naked body with ice water will suffice in some cases; in others, when the temperature is over $102\frac{1}{2}^{\circ}$ F., enveloping the whole body in a sheet wet in water at 65° , and either rubbing the surface with ice or cloths wet in ice-cold water, for ten or fifteen minutes, is advisable. Rubbing of the skin of the chest and sides is necessary during the application of cold to prevent shock. The use of a cold cloth on the head and hot-water bottle at the feet, during the sponging, will also prove beneficial. In children and others objecting to these cold applications, the vapor bath is effective. For this a piece of cheese cloth (single thickness) is wet with warm water— 100° to 105° —and is wrapped about the naked body from shoulders to feet, and is continually wet by sprinkling with water at the temperature of 98° . The evaporation of the water will usually, in fifteen to twenty minutes, cool the body sufficiently if the patient is fanned continuously by two attendants. In warm weather the patient should only be covered with a sheet for a while after the bath, which should reduce the temperature to 3° . Hot water at the feet, and a little

brandy or whisky given before the sponging if the pulse be feeble, will generally prevent a chill. Patients should be gently dried after the bath and covered with dry bedclothing. The utmost care should be taken not to agitate a feeble patient during sponging.

The long period of lying in bed favors the occurrence of bedsores. These are apt to appear about the lower part of the spine, and begin with redness of the skin, underneath which a lump may be felt. Constant cleanliness and bathing with alcohol, diluted with an equal amount of water, will tend to prevent this trouble, while moving the patient so as to take the pressure off this region and avoiding any rumpling of the bedding under his body are also serviceable, as well as the ring air cushion. Medicine is not required, except for special symptoms, and has no influence either in lessening the severity of or in shortening the disease. Brandy or whisky diluted with water are valuable in severe cases, with muttering delirium, dry tongue, and feeble pulse; it is not usually called for before the end of the second week, and not in mild cases at any time. A tablespoonful of either, once in two to four hours, is commonly sufficient. Pain and distention of the belly are relieved by applying a pad over the whole front of the belly—consisting of two layers of flannel wrung out of a little very hot water containing a teaspoonful of turpentine—and covered by a dry flannel bandage wrapped about the body. Also the use of white of egg and water, and

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beef juice, instead of milk, will benefit this condition.

Diarrhea—if there are more than four discharges daily—may be checked by one-quarter level teaspoonful doses of bismuth subnitrate, or teaspoonful doses of paregoric, once in three hours. Constipation is relieved by injections of warm soapsuds, once in two days. Bleeding from the bowels must be treated by securing perfect quiet on the patient's part, and by giving lumps of ice by the mouth, and cutting down the nourishment for six hours. Fifteen drops of laudanum should be given to adults, if there is restlessness, and some whisky, if the pulse becomes feeble, but it is better to reserve this until the bleeding has stopped. Patients may be permitted to sit up after a week of normal temperature, but solid food must not be resumed until two or three weeks after departure of fever, and then very gradually, avoiding all coarse and uncooked vegetables and fruit.

The greatest care must be exercised by attendants to escape contracting the disease and to prevent its communication to others. The bowel discharges must be submerged in milk of lime (one part of slaked lime to four parts of water), and remain in it one hour before being emptied. The urine should be mixed with an equal amount of the same, or solution of carbolic acid (one part in twenty parts of hot water), and the mixture should stand an hour before being thrown into privy or sewer. Clothing and linen in contact with

the patient must be soaked in the carbolic solution for two hours. The patient's expectoration is to be received on old muslin pieces, which must be burned. The bedpan and eating utensils must be frequently scalded in boiling water. The attendant should wash his hands always after touching the patient, or objects which have come in contact with patient or his discharges, and thus will avoid contagion. If farm or dairy workers come in contact with the patient, the latter precaution is especially important. If there is no water-closet in the house, the disinfected discharges may be buried at least 100 feet from any well or stream. Typhoid fever is only derived from the germs escaping in the urine, and in the bowel, nose, or mouth discharges of typhoid patients.

MUMPS.—Mumps is a contagious disease characterized by inflammation of the parotid glands, situated below and in front of the ears, and sometimes of the other salivary glands below the jaw, and rarely of the testicles in males and the breasts in females.

Swelling and inflammation of the parotid gland also occur from injury; and as a complication of other diseases, as scarlet fever, typhoid fever, etc.; but such conditions are wholly distinct from the disease under discussion. Mumps is more or less constantly prevalent in most large cities, more often in the spring and fall, and is often epidemic, attacking ninety per cent of young persons who have not previously had the disease. It is more common in males, affecting chil-

Mumps

dren and youths, but rarely infants or those past middle age. One attack usually protects against another.

Development.—A period of from one to three weeks elapses, after exposure to the disease, before the first signs develop. The germ has not yet been discovered, and the means of communication are unknown. The breath has been thought to spread the germs of the disease, and mumps can be conveyed from the sick to the well, by nurses and others who themselves escape.

Symptoms.—Sometimes there is some preliminary discomfort before the apparent onset. Thus, in children, restlessness, peevishness, languor, nausea, loss of appetite, chilliness, fever, and convulsions may usher in an attack. Mumps begins with pain and swelling below the ear on one side. Within forty-eight hours a large, firm, sensitive lump forms under the ear and extends forward on the face, and downward and backward in the neck. The swelling is not generally very painful, but gives a feeling of tightness and disfigures the patient. It makes speaking and swallowing difficult; the patient refuses food, and talks in a husky voice; chewing causes severe pain. After a period of two to four days the other gland usually becomes similarly inflamed, but occasionally only one gland is attacked. There is always fever from the beginning. At first the temperature is about 101° F., rarely much higher than 103° or 104°. The fever continues four

or five days and then gradually declines. The swelling reaches its height in from two to five days, and then after forty-eight hours slowly subsides, and disappears entirely within ten to fourteen days. The patient may communicate the disease for ten days after the fever is past, and needs to be isolated for that period. Ear-ache and noises in the ear frequently accompany mumps, and rarely abscess of the ear and deafness result. The most common complication occurs in males past puberty, when, during recovery or a week or ten days later, one or both testicles become painful and swollen, and this continues for as long a time as the original mumps. Less often the breasts and sexual organs of females are similarly affected.

Complications and Sequels.—Recovery without mishap is the usual result in mumps, with the exception of involvement of the testicles. Rarely there are high fever, delirium, and great prostration. Sometimes after inflammation of both testicles in the young the organs cease to develop, and remain so, but sexual vigor is usually retained. Sometimes abscess and gangrene of the inflamed parotid gland occur. Recurring swelling and inflammation of the gland may occur, and permanent swelling and hardness remain. Meningitis, nervous and joint complications are among the rarer sequels.

Treatment.—The patient should remain in bed while the fever lasts. A liquid diet is advisable during this time. Fever may be allayed by frequent

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sponging of the naked body with tepid water. High fever and delirium demand the constant use, on the head, of the ice cap (a rubber bag, made to fit the head, containing ice). The relief of pain in the swollen gland is secured by the frequent application of a thick layer of sheet cotton, large enough to cover the whole side of the neck, wrung out of hot water and covered with oil-silk or rubber sheeting, with a bandage to retain it in place.

Paregoric may be given for the same purpose—a tablespoonful for adults; a teaspoonful for a child of eight to ten, well diluted with water, and not repeated inside of two hours, and not then unless the pain continues unabated. Inflammation of the testicles demands rest in bed, elevation of the testicle on a pillow after wrapping it in a thick layer of absorbent cotton, or applying hot compresses, as recommended for the neck. After the first few days of this treatment, adjust a suspensory bandage, which can be procured at any apothecary shop, and apply daily the following ointment: guiacol, sixty grains; lard, one-half ounce, over the swollen testicle.

WHOOPIING COUGH.—A contagious disease characterized by fits of coughing, during which a whooping or crowing sound is made following a long-drawn breath. Whooping cough is generally taken through direct contact with the sick, rarely through exposure to the sick room, or to persons or clothing used by the sick. The germ which causes the disease

is probably in the mucus of the nose and throat. Whooping cough is usually more or less prevalent in all thickly settled civilized communities, at times is epidemic, and often follows epidemics of measles. It occurs chiefly in children from six months to six years of age. Girls and all weak and delicate subjects are slightly more susceptible to the disease. Some children are naturally immune to whooping cough. One attack usually protects against another.

Development.—A variable period elapses between the time of exposure to whooping cough and the appearance of the first symptoms. This may be from two days to two weeks; usually seven to ten days.

Symptoms.—Whooping cough begins like an ordinary cold in the head, with cough, worse at night, which persists. The coughing fits increase and the child gets red in the face, has difficulty in getting its breath during them, and sometimes vomits when the attack is over. After a variable period, from a few days to two weeks from the beginning of the cough, the peculiar feature of the disease appears. The child gives fifteen or twenty short coughs without drawing breath, the face swells and grows blue, the eyeballs protrude, the veins stand out, and the patient appears to be suffocating, when at last he draws in a long breath with a crowing or whooping sound, which gives rise to the name of the disease. Several such fits of coughing may follow one another and are often succeeded by vomiting and the expulsion of a large

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amount of phlegm or mucus, which is sometimes streaked with blood. In mild cases there may be six to twelve attacks in twenty-four hours; in severe cases from forty to eighty. The attacks last from a few seconds to one or two minutes. Occasionally the whoop comes before the coughing fit, and sometimes there may be no whooping at all, only fits of coughing with vomiting. Between the attacks, puffiness of the face and eyes and blueness of the tongue persist. The coughing fits and whooping last usually from three to six weeks, but the duration of the disease is very variable. Occasionally it lasts many months, especially when it occurs in winter. The contagiousness of whooping cough continues about two months, or ceases before that time with the cessation of the cough. Oftentimes there may be occasional whooping for months; or, after ceasing altogether for some days, it may begin again. In neither of these conditions is the disease considered still contagious after two months. When an attack of whooping is coming on, the child often seems to have some warning, as he seems terrified and suddenly sits up in bed, or, if playing, grasps hold of something, or runs to his mother or nurse. Coughing fits are favored by emotion or excitement, by crying, singing, eating, drinking, sudden change of temperature, and by bad air.

Complications and Sequels.—These are many and make whooping cough a critical disease for very young children. Bronchitis and pneumonia often compli-

cate whooping cough in winter, and diarrhea frequently occurs with it in summer. Convulsions not infrequently follow the coughing fits in infants, and, owing to the amount of blood forced to the head during the attacks, nosebleed and dark spots on the forehead and surface of the eyes appear from breaking of small blood vessels in these places. Severe vomiting and diarrhea occasionally aggravate the case, and pleurisy and consumption may occur. The violent coughing may permanently damage the heart. Rupture of the lung tissue happens from the same cause, and paralysis sometimes follows breaking of a blood vessel in the brain. But in the vast majority of cases in children over two years old no dangerous sequel need be feared.

Outlook.—Owing to the numerous complications, whooping cough must be looked upon as a very serious disease, especially in infants under two years, and in weak, delicate children. It causes one-fourth of all deaths among children, the death rate varying from three to fifteen per cent in different times and under different circumstances. For this reason a physician's services should always be secured when possible.

Treatment.—A host of remedies is used for whooping cough, but no single one is always the best. It is often necessary to try different medicines till we find one which excels. Fresh air is of greatest importance. Patients should be strictly isolated in rooms by themselves, and it is wise to send away children

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who have not been exposed. Morally, parents are criminally negligent who allow their children with whooping cough to associate with healthy children. If the coughing fits are severe or there is fever, children should be kept in bed. Usually there is not much fever; perhaps an elevation of a degree or two at first, and at times during the disease. Otherwise, children may be outdoors in warm weather, and in winter on warm, quiet days. Sea air is especially good for them. It is best that the sick should have two rooms, going from one to the other, so that the windows in the room last occupied may be opened and well ventilated. Fresh air at night is especially needful, and the patient should sleep in a room which has been freshly aired. The temperature should be kept at an even 70° F., and the child should not be exposed to draughts. Vaporizing antiseptics in the sick room has proved beneficial. A two per cent solution of carbolic acid in water is useful for this purpose, or a substance called vapo-cresoline, with which is sold a vaporizing lamp and directions for use. A one per cent solution of resorcin, or of hydrogen dioxide, diluted with four parts of water, used in an atomizer for spraying the throat, every two hours, has given good results. In the beginning of the disease, before the whooping has begun, a mixture of paregoric and syrup of ipecac will relieve the cough, ten drops of the former with five of the latter, for a child of two years, given together in water every three hours. The bromide of sodium, five

grains in water, every three hours during the day, for a child of two, is serviceable in relieving the fits of coughing in the day; while at night, two grains of chloral, not repeated, may be given in water at bedtime to secure sleep, in a child of two. The tincture of belladonna, in doses of two drops in water, three times daily, for a child of two, is also often efficacious. Quinine, given in the dose of one-sixth grain for each month of the child's age under a year; or in one and one-half grain doses for each year of age under five, is one of the older and more valuable remedies. It should be given three times daily in pill with jelly, or solution in water. Bromoform in doses of two drops for a child of two, and increasing to five drops for a child of six, may be given in syrup three times daily with benefit. Most of these drugs should be employed only with a doctor's advice, when this is possible. To sum up, use the vapo-cresoline every day. When no physician is available, begin with belladonna during the day, using bromide of sodium at night. If this fails to modify the whooping after five days' trial, use bromide and chloral. In severe cases use bromoform. During a fit of coughing and whooping, it is well to support the child's head, and if he ceases to breathe, he should be slapped over the face and chest with a towel wet with cold water. Interference with sleep caused by coughing, and loss of proper nourishment through vomiting, lead to wasting and debility. Teaspoonful doses of emulsion of cod-liver oil

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three times daily, after eating, are often useful in convalescence, and great care must be taken at this time to prevent exposure and pneumonia. Change of air and place will frequently hasten recovery remarkably in the later stages of the disease.

ERYSIPELAS.—Erysipelas is a disease caused by germs which gain entrance through some wound or abrasion in the skin or mucous membranes. Even where no wound is evident it may be taken for granted that there has been some slight abrasion of the surface, although invisible. Erysipelas cannot be communicated any distance through the air, but it is contagious in that the germs which cause it may be carried from the sick to the well by nurses, furniture, bedding, dressings, clothing, and other objects. Thus, patients with wounds, women in childbirth, and the newborn may become affected, but modern methods of surgical cleanliness have largely eliminated these forms of erysipelas, especially in hospitals, where it used to be common. Erysipelas attacks people of all ages, some persons being very susceptible and suffering frequent recurrences. The form which arises without any visible wound is seen usually on the face, and occurs most frequently in the spring. The period of development, from the time the germs enter the body until the appearance of the disease, lasts from three to seven days.

Erysipelas begins with usually a severe chill (or convulsion in a baby) and fever. Vomiting, head-

ache, and general lassitude are often present. A patch of red appears on the cheeks, bridge of nose, or about the eye or nostril, and spreads over the face. The margins of the eruption are sharply defined. Within twenty-four hours the disease is fully developed; the skin is tense, smooth, and shiny, scarlet and swollen, and feels hot, and is often covered with small blisters. The pain is more or less intense, burning or itching occurs, and there is a sensation of great tightness or tension. On the face the swelling closes the eye and may interfere with breathing through the nose. The lips, ears, and scalp are swollen, and the person may become unrecognizable in a couple of days. Erysipelas tends to spread like a drop of oil, and the borders of the inflammatory patch are well marked. It rarely spreads from the face to the chest and body, and but occasionally attacks the throat. During the height of the inflammation the temperature reaches 104° F., or over. After four or five days, in most cases, erysipelas begins to subside, together with the pain and temperature, and recovery occurs with some scaling of the skin. The death rate is said to average about ten per cent in hospitals, four per cent in private practice. Headache, delirium, and stupor are common when erysipelas attacks the scalp. The appearance of the disease in other locations is similar to that described. Relapses are not uncommon, but are not so severe as the original attack. Spreading may extend over a large area, and the deeper parts may become affected,

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with the formation of deep abscesses and great destruction of tissue. Certain internal organs, heart, lungs, spleen, and kidneys, are occasionally involved with serious consequences. The old, the diseased, and the alcoholic are more apt to succumb, also the newborn. It is a curious fact that cure of malignant growths (sarcoma), chronic skin diseases, and old ulcers sometimes follows attacks of erysipelas.

Treatment.—The duration of erysipelas is usually from a few days to about two weeks, according to its extent. It tends to run a definite course and to recovery in most cases without treatment. The patient must be isolated in a room with good ventilation and sunlight. Dressings and objects coming in contact with him must be burned or boiled. The diet should be liquid, such as milk, beef tea, soups, and gruels. The use of cloths wet constantly with cold water, or with a cold solution of one-half teaspoonful of pure carbolic acid to the pint of hot water, or with a poisonous solution of sugar of lead, four grains to the pint, should be kept over small inflamed areas. Fever is reduced by sponging the whole naked body with cold water at frequent intervals. A tablespoonful of whisky or brandy in water may be given every two hours to adults if the pulse is weak. Painting the borders of the inflamed patch with contractile collodion may prevent its spreading. The patient must be quarantined until all scaling ceases, usually for two weeks.

CHAPTER III

Malaria and Yellow Fever

*The Malarial Parasite—Mosquitoes the Means of Infection—
Different Forms of Malaria—Symptoms and Treatment—No
Specific for Yellow Fever.*

MALARIA; CHILLS AND FEVER; AGUE; FEVER AND AGUE; SWAMP OR MARSH FEVER; INTERMITTENT OR REMITTENT FEVER; BILIOUS FEVER.—Malaria is a communicable disease characterized by attacks of fever occurring at certain intervals, and due to a minute animal parasite which inhabits the body of the mosquito, and is communicated to the blood of man by the bites of this insect.

In accordance with this definition malaria is not a contagious disease in the sense that it is acquired by contact with the sick, which is not the case, but it is derived from contact with certain kinds of mosquitoes, and can be contracted in no other way, despite the many popular notions to the contrary. Mosquitoes, in their turn, acquire the malarial parasite by biting human beings suffering from malaria. It thus becomes possible for one malarial patient, coming to a region hitherto free from the disease, to infect the whole

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district with malaria through the medium of mosquitoes.

Causes.—While the parasite infesting mosquitoes is the only direct cause of malaria, yet certain circumstances are requisite for the life and growth of the mosquitoes. These are moisture and proper temperature, which should average not less than 60° F. Damp soil, marshes, or bodies of water have always been recognized as favoring malaria.

Malaria is common in temperate climates—in the summer and autumn months particularly, less often in spring, and very rarely in winter, while it is prevalent in the tropics and subtropics all the year round, but more commonly in the spring and fall of these regions. The older ideas, that malaria was caused by something arising in vapors from wet grounds or water, or by contamination of the drinking water, or by night air, or was due to sleeping outdoors or on the ground floors of dwellings, are only true in so far as these favor the growth of the peculiar kind of mosquitoes infected by the malarial parasites. Two essentials are requisite for the existence of malaria in a region: the presence of the particular mosquito, and the actual infection of the mosquito with the malarial parasite. The kind of mosquito acting as host to the malarial parasite is the genus *Anopheles*, of which there are several species. The more common house mosquito of the United States is the *Culex*. The *Anopheles* can usually be distinguished from the latter

by its mottled wings, and, when on a wall or ceiling, it sits with the body protruding at an angle of 45° from the surface, with its hind legs hanging down or drawn against the wall. In the case of the *Culex*, the body is held parallel with the wall, the wings are usually not mottled, and the hind legs are carried up over the back.

When a mosquito infected with the malarial parasite bites man, the parasite enters his blood along with the saliva that anoints the lancet of the mosquito. The parasite is one of the simplest forms of animal life, consisting of a microscopical mass of living, motile matter which enters the red-blood cell of man, and there grows, undergoes changes, and, after a variable time, multiplies by dividing into a number of still smaller bodies which represent a new generation of young parasites. This completes the whole period of their existence. It is at that stage in the development of the parasite in the human body when it multiplies by dividing that the chills and fever in malaria appear. What causes the malarial attack at this point is unknown, unless it be that the parasites give rise to a poison at the time of their division. Between the attacks of chills and fever in malaria there is usually an interval of freedom of a few hours, which corresponds to the period intervening in the life of the parasite in the human body, between the birth of the young parasites and their growth and final division, in turn, into new individuals. This interval varies with the kind of parasite. The common form of malaria is caused by a parasite re-

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quiring forty-eight hours for its development. The malarial attacks caused by this parasite then occur every other day, when the parasite undergoes reproduction by division. However, an attack may occur every day when there are two separate groups of these parasites in the blood, the time of birth of one set of parasites, with an accompanying malarial attack, happening one day; that of the other group coming on the next, so that between the two there is a daily birth of parasites and a daily attack of malaria. In cases of malaria caused by one group of parasites the attacks appear at about the same time of day, but when the attacks are caused by different groups of parasites the times of attack may vary on different days. In the worst types of malaria the parasites do not all go through the same stages of development at the same time, as is commonly the case in the milder forms prevalent in temperate regions, so that the fever—corresponding to the stage of reproduction of the parasites—occurs at irregular intervals.

In a not uncommon type of malaria the attacks occur every third day, with two days of intermission or freedom from fever. Different groups of parasites causing this form of malaria, and having different times of reproduction, may inhabit the same patient and give rise to variation in the times of attack. Thus, an attack may occur on two successive days with a day of intermission.

The reproduction of the parasite in the human

blood is not a sexual reproduction; that takes place in the body of the mosquito.

When a healthy mosquito bites a malarial patient, the parasite enters the body of the mosquito with the blood of the patient bitten. It enters its stomach, where certain differing forms of the parasite, taking the part of male and female individuals, unite and form a new parasite, which, entering the stomach wall of the mosquito, gives birth in the course of a week to innumerable small bodies as their progeny. These find their way into the salivary glands which secrete the poison of the mosquito bite, and escape, when the mosquito bites a human being, into the blood of the latter and give him malaria.

Distribution.—Malaria is very widely distributed, and is much more severe in tropical countries and the warmer parts of temperate regions. In the United States malaria is prevalent in some parts of New England, as in the Connecticut Valley, and in the course of the Charles River, in the country near Boston. It is common in the vicinity of the cities of Philadelphia, New York, and Baltimore, but here is less frequent than formerly, and is of a comparatively mild type. More severe forms prevail along the Gulf of Mexico and the shores of the Mississippi and its branches, especially in Mississippi, Texas, Louisiana, and Arkansas, but even here it is less fatal and widespread than formerly. In Alaska, the Northwest, and on the Pacific Coast of the United States malaria is almost unknown.

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while it is but slightly prevalent in the region of the Great Lakes, as about Lakes Erie and St. Clair.

Development.—Usually a week or two elapses after the entrance of the malarial parasite into the blood before symptoms occur; rarely this period is as short as twenty-four hours, and occasionally may extend to several months. It often happens that the parasite remains quiescent in the system without being completely exterminated after recovery from an attack, only to grow and occasion a fresh attack, a month or two after the first, unless treatment has been thoroughly prosecuted for a sufficient time.

Symptoms.—Certain symptoms give warning of an attack, as headache, lassitude, yawning, restlessness, discomfort in the region of the stomach, and nausea or vomiting. The attack begins with a chilliness or creeping feeling, and there may be so severe a chill that the patient is violently shaken from head to foot and the teeth chatter. Chills are not generally seen in children under six, but an attack begins with uneasiness, the face is pinched, the eyes sunken, the lips and tips of the fingers and toes are blue, and there is dullness and often nausea and vomiting. Then, instead of a chill, the eyelids and limbs begin to twitch, and the child goes into a convulsion. While the surface of the skin is cold and blue during a chill, yet the temperature, taken with the thermometer in the mouth or bowel, reaches 102° , 105° , or 106° F., often. The chill lasts from a few minutes to an hour, and

as it passes away the face becomes flushed and the skin hot. There is often a throbbing headache, thirst, and sometimes mild delirium. The temperature at this time, when the patient feels intensely feverish, is very little higher than during the chill. The fever lasts during three or four hours, in most cases, and gradually declines, as well as the headache and general distressing symptoms with the onset of sweating, to disappear in an hour or two, when the patient often sinks into a refreshing sleep. Such attacks more commonly occur every day, every other day, or after intermissions of two days. Rarely do attacks come on with intervals of four, five, six, or more days. The attacks are apt to recur at the same time of day as in the first attack. In severe cases the intervals may grow shorter, in mild cases, longer. In the interval between the attacks the patient usually feels well unless the disease is of exceptional severity. There is also entire freedom from fever in the intervals except in the grave types common to hot climates. Frequently the chill is absent, and after a preliminary stage of dullness there is fever followed by sweating. This variety is known as "dumb ague."

Irregular and Severe Form—Chronic Malaria.—This occurs in those who have lived long in malarial regions and have suffered repeated attacks of fever, or in those who have not received proper treatment. It is characterized by a generally enfeebled state, the patient having a sallow complexion, cold

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hands and feet, and temperature below normal, except occasionally, when there may be slight fever. When the condition is marked, there are breathlessness on slight exertion, swelling of the feet and ankles, and "ague cake," that is, enlargement of the spleen, shown by a lump felt in the abdomen extending downward from beneath the ribs on the left side.

Among unusual forms of malaria are: periodic attacks of drowsiness without chills, but accompanied by slight fever (100° to 101° F.); periodic attacks of neuralgia, as of the face, chest, or in the form of sciatica; periodic "sick headaches." These may take the place of ordinary malarial attacks in malarial regions, and are cured by ordinary malarial treatment.

Remittent Form (unfortunately termed "bilious").—This severe type of malaria occurs sometimes in late summer and autumn, in temperate climates, but is seen much more commonly in the Southern United States and in the tropics. It begins often with lassitude, headache, loss of appetite and pains in the limbs and back, a bad taste, and nausea for a day or two, followed by a chill, and fever ranging from 101° to 103° F., or more. The chill is not usually repeated, but the fever is continuous, often suggesting typhoid fever. With the fever, there are flushed face, occasional delirium, and vomiting of bile, but more often a drowsy state. After twelve to forty-eight hours the fever abates, but the temperature does not usually fall below 100° F., and the patient feels better, but not

entirely well, as in the ordinary form of malaria, where the fever disappears entirely between the attacks. After an interval varying from three to thirty-six hours the temperature rises again and the more severe symptoms reappear, and so the disease continues, there never being complete freedom from fever, the temperature sometimes rising as high as 105° or 106° F. In some cases there are nosebleed, cracked tongue, and brownish deposit on the teeth, and a delirious or stupid state, as in typhoid fever, but the distention of the belly, diarrhea, and rose spots are absent. The skin and whites of the eyes often take on the yellowish hue of jaundice. This fever has been called typhomalarial fever, under the supposition that it was a hybrid of the two. This is not the case, although it is possible that the two diseases may occur in the same individual at the same time. This, indeed, frequently happened as stated, in our soldiers coming from the West Indies during the Spanish-American War—but is an extremely uncommon event in the United States.

Pernicious Malaria.—This is a very grave form of the disease. It rarely is seen in temperate regions, but often occurs in the tropics and subtropics. It may follow an ordinary attack of chills and fever, or come on very suddenly. After a chill the hot stage appears, and the patient falls into a deep stupor or unconscious state, with flushed face, noisy breathing, and high fever (104° to 105° F.). Wild delirium or convul-

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sions afflict the patient in some cases. The attack may last for six to twenty-four hours, from which the patient may recover, only to suffer another like seizure, or he may die in the first. In another form of this pernicious malaria the symptoms resemble true cholera, and is peculiar to the tropics. In this there are violent vomiting, watery diarrhea, cramps in the legs, cold hands and feet, and collapse. Sometimes the attack begins with a chill, but fever, if any, is slight, although the patient complains of great thirst and inward heat. The pulse is feeble and the breathing shallow, but the intellect remains clear.

Death often occurs in this, as in the former type of pernicious malaria, yet vigorous treatment with quinine, iron, and nitre will frequently prove curative in either form.

Black Water Fever.—Rarely in temperate climates, but frequently in the Southern United States and in the tropics, especially Africa; after a few days of fever, or after chilliness and slight fever, the urine becomes very dark, owing to blood escaping in it. This sometimes appears only periodically, and is often relieved by quinine. It is apparently a malarial fever with an added infection from another cause.

Chagres Fever.—A severe form of malarial fever acquired on the Isthmus of Panama, apparently a hemorrhagic form of the pernicious variety, and so treated.

Detection.—To the well-educated physician is now open an exact method of determining the existence of

malaria, and of distinguishing it from all similar diseases, by the examination of the patient's blood for the malarial parasite—its presence or absence deciding the presence or absence of the disease. For the layman the following points are offered: intermittency of chills and fever, or of fever alone, should suggest malaria, particularly in a patient living in or coming from a malarial region, or in a previous sufferer from the disease. In such a case treatment with quinine will solve the doubt in most cases, and will do no harm even if the disease be not malaria. Malaria is one of the few diseases which can be cured with certainty by a drug; failure to stop the symptoms by proper amounts of quinine means, in the vast majority of cases, that they are not due to malaria. There are many other diseases in which chills, fever, and sweating occur at intervals, as in poisoning from the presence of suppuration or formation of pus anywhere in the body, but the layman's ignorance will not permit him to recognize these in many instances. The quinine test is the best for him.

Prevention.—Since the French surgeon, Laveran, discovered the parasite of malaria in 1880, and Manson, in 1896, emphasized the fact that the mosquito is the medium of its communication to man, the way for the extermination of the disease has been plain. "Mosquito engineering" has attained a recognized place. This consists in destroying the abodes of mosquitoes (marshes, ponds, and pools) by drainage and filling, also in the application of petroleum on their sur-

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face to destroy the immature mosquitoes. Such work has already led to wonderful results.¹ Open water barrels and water tanks prove a fruitful breeding place for these insects, and should be abolished. The protection of the person from mosquito bites is obtained by proper screening of habitations and the avoidance of unscreened open air, at or after night-fall, when the pests are most in evidence. Dwellings on high grounds are less liable to mosquitoes. Persons entering a malarial region should take from two to three grains of quinine three times a day to kill any malarial parasites which may invade their blood, and should screen doors and windows. Patients after recovery from malaria must prolong the treatment as advised, and renew it each spring and fall for several years thereafter. A malarial patient is a direct menace to his entire neighborhood, if mosquitoes enter.

Treatment.—The treatment of malaria practically means the use of quinine given in the proper way and in the proper form and dose. Despite popular prejudices against it, quinine is capable of little harm, unless used in large doses for months, and no other remedy has yet succeeded in rivaling it in any way. Quinine is frequently useless from adulteration; this may be avoided by getting it of a reliable drug house and paying a fair price for the best to be had. Neither pills nor tablets of quinine are suitable, as they sometimes pass through the bowels undissolved. The drug should

¹ See Volume V, p. 76, for detailed methods.—EDITOR.

be taken dissolved in water, or, more pleasantly, in starch wafers or gelatin capsules. When the drug is vomited it may be given (in double the dose) dissolved in half a pint of water, as an injection into the bowels, three times daily. Infants of a few months may be treated by rubbing an ointment (containing thirty grains of quinine sulphate mixed with an ounce and a half of lard) well into the skin of the armpits and groins, night and morning. Children under the age of two can be best treated by quinine made into suppositories—little conical bodies of cocoa butter containing two grains each—one being introduced into the bowel, night and morning.

During an attack of malaria the discomfort of the chill and fever may be relieved to considerable extent by thirty grains of sodium bromide (adult dose) in water. Hot drinks and hot-water bottles with warm covering may be used during the chill, while cold sponging of the whole naked body will afford comfort during the hot stage. In the pernicious form, attended with unconsciousness, sponging with very cold water, or the use of the cold bath with vigorous friction of the whole body and cold to the head are valuable. The effect of quinine is greatest during the time of birth of a new generation of young parasites in the blood, which corresponds with the time of the malarial attack. But in order that the quinine shall have time to permeate the blood, it must be given two to four hours before the expected chill, and then will probably prevent

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the next attack but one. A dose of ten grains of quinine sulphate taken three times daily for the first three days of treatment; then a dose of three grains, three times daily for two weeks; and finally two grains, three times daily for the rest of the month of treatment will, in many cases, complete a cure. If the quinine cause much ringing in the ears and deafness, it will be found that sodium bromide taken with the quinine (in twice the dose) dissolved in water, will correct this trouble. If the patient is constipated and the bowel discharges are light colored, a few one-quarter grain doses of calomel may be taken every two hours, and followed in twelve hours by a dose of Epsom salts, on the first day of treatment, with quinine. It is no use to take quinine by the mouth later than two hours before an attack, and if the patient cannot secure treatment before this time, he should take a single dose of twenty grains of quinine.

To children may be given a daily amount of quinine equal to one grain for each year of their age. In the severe forms of remittent and pernicious types of malaria it may be necessary for the patient to take as much as thirty grains of quinine every three days or so to cut short the attack. But, unfortunately, the digestion may be so poor that absorption of the drug does not occur, and in such an event the use of quinine in the form of the bisulphate in thirty-grain doses, with five grains of tartaric acid, will in some cases prove effective. Chronic malaria is best treated

with small doses of quinine, together with arsenic and iron. A capsule containing two grains of quinine sulphate, one-thirtieth grain of arsenious acid, and two grains of reduced iron should be taken three times daily for several weeks.

YELLOW FEVER.—This is a disease of tropical and subtropical countries characterized by fever, jaundice, and vomiting (in severe cases vomiting of blood), caused by a special germ or parasite which is communicated to man solely through the agency of the bites of a special mosquito, *Stegomyia fasciata*.

Distribution.—Yellow fever has always been present in Havana, Rio, Vera Cruz, and other Spanish-American seaports; also on the west coast of Africa. It is frequently epidemic in the tropical ports of the Atlantic in America and Africa, and there have been numerous epidemics in the southern and occasional ones in the northern seacoast cities of the United States. The last epidemic occurred in the South in 1899. Rarely has the disease been introduced into Europe, and it has never spread there except in Spanish ports. The disease is one requiring warm weather, for a temperature under 75° F. is unsuitable to the growth of the special mosquito harboring the yellow-fever parasite. It spreads in the crowded and unsanitary parts of seacoast cities, to which it is brought on vessels by contaminated mosquitoes or yellow-fever patients from the tropics. Havana has heretofore been the source of infection for the United States, but

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since the disease has been eradicated by the American army of occupation, that danger has been removed. Yellow fever is not at all contagious in the sense that a healthy person can contract the disease by contact with a yellow-fever patient, or with his discharges from the stomach, bowels, or elsewhere, and is probably only communicated to man by the bite of a particular kind of mosquito harboring the yellow-fever organism in its body. Both these facts have been incontestably proved,¹ in part by brave volunteers from the United States Army who submitted to sleep for twenty-one days on clothes soiled with discharges from patients dying of yellow fever, and escaped the disease; and by others living in uncontaminated surroundings who permitted themselves to be bitten by infected mosquitoes and promptly developed yellow fever.

Development.—After a person has been bitten by an infected mosquito, from fourteen hours to five days and seventeen hours elapse before the development of the first symptoms—usually this period lasts from three to four days. With the appearance of a single case in a region, a period of two weeks must elapse before the development of another case arising from the first one. This follows because a mosquito, after biting a patient, cannot communicate the germ to another person for twelve days, and two days more must elapse before the disease appears in the latter.

Symptoms.—During the night or morning the pa-

¹ See Frontispiece, Vol. V.

tient has a chill (or feels chilly) and experiences discomfort in the stomach, with sometimes nausea and vomiting. There is pain through the forehead and eyes, in the back and thighs, and often in the calves. The face is flushed and slightly swollen—particularly the upper lip—and the eyes are bloodshot, and gradually, in the course of thirty-six hours, the whites become yellowish. This is one of the most distinguishing features of the fever, but is often absent in children. The tongue is coated, there are loss of appetite, lassitude, sore throat, and constipation. In the beginning the temperature ranges from 101° to 103° F., or in severe cases as high as 105° or 106° F., and the pulse from 110 to 120 beats a minute. The fever continues for several days—except in mild cases—but the pulse usually falls before the temperature does. For example, the temperature may rise a degree during the third day to 103° F., while the pulse falls ten or more beats at the same time and may not be over 70 or 80, while the temperature is still elevated. This is another peculiar feature of the disease. Vomiting often increases on the second or third day, and the dreaded “black vomit” may then occur. This presents the appearance of coffee grounds or tarry matter and, while a dangerous symptom, does not by any means presage a fatal ending. The black color is due to altered blood from the stomach, and bleeding sometimes takes place from the nose, throat, gums, and bowels, with black discharges from the latter. The

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action of the kidneys is usually interfered with, causing diminution in the amount of urine. It is extremely important to pay regard to this feature, because failure of the patient to pass a proper amount of urine calls for prompt action to avert fatal poisoning from retained waste matters in the blood. The normal amount of urine passed in twenty-four hours in health is over three pints, and while not more than two-thirds of this amount could be expected to be passed by a fever patient, yet in yellow fever the passage of urine may be almost or wholly suppressed. The course of the disease varies greatly. In children—especially of the Creoles—it is frequently so mild as to pass unnoticed. In adults the fever may only last a few hours, or two or three days, with gradual recovery from the various symptoms, and yellowness of the skin lasting for some time. This is not seen readily during the stage of fever when the surface is reddened, but at that time may be detected by pressure on the skin for a minute, when the skin will present a yellow hue on removing the finger before the blood returns to the pressure spot. With fall of fever, and abatement of symptoms after two or three days, the patient, instead of going on to recovery may, after a few hours or a day or two, again become very feverish and have vomiting—perhaps of blood or black vomit—yellow skin, feeble pulse, failure of kidney action with suppression of urine, delirium, convulsions, stupor, and death; or may begin to again recover after a few days. Mild fever, slight

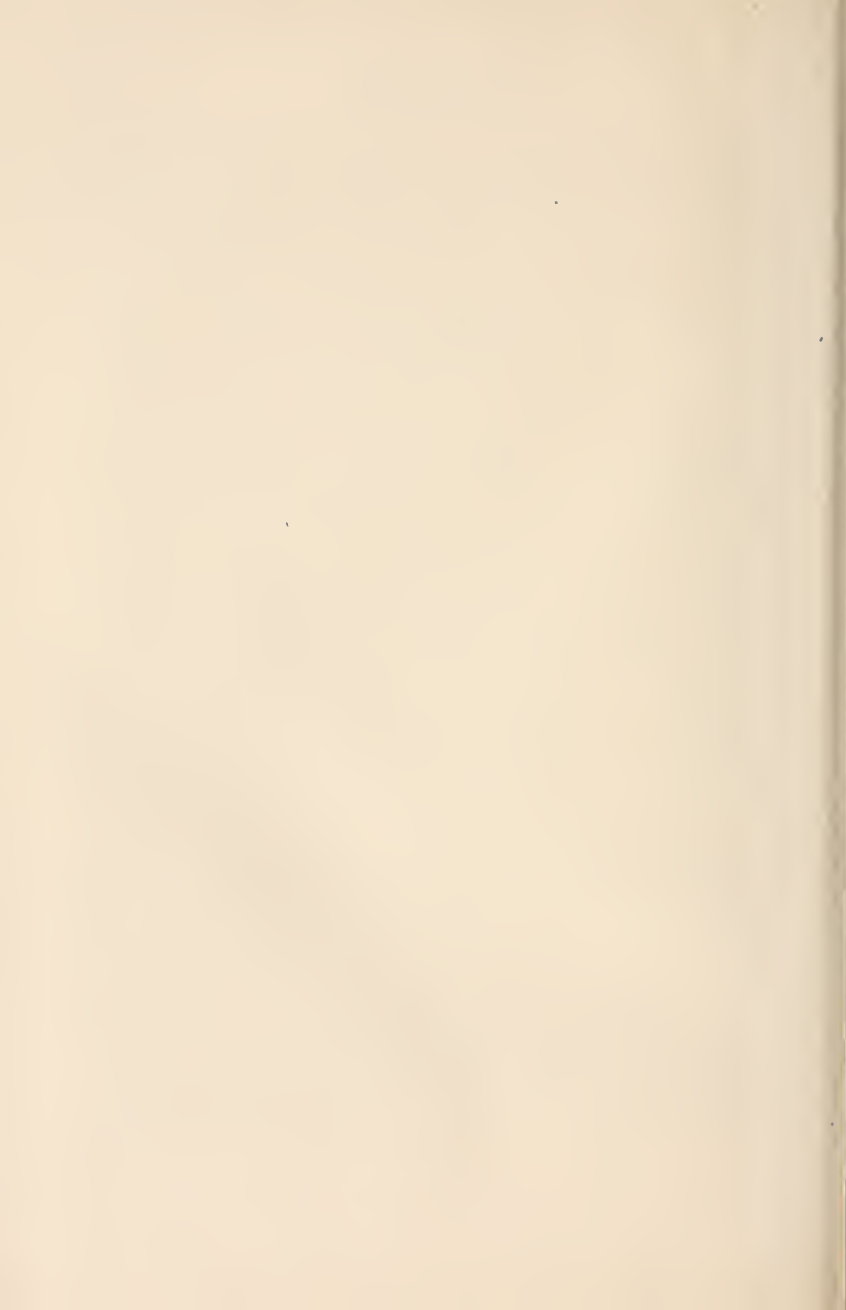
jaundice, and absence of bleeding are favorable signs; black vomit, high fever, and passage of little urine are unfavorable signs. The death rate is very variable in different epidemics and among different classes; anywhere from fifteen to eighty-five per cent. Among the better classes it is often not greater than ten per cent in private practice. Heavy drinkers and those living in unfavorable surroundings are apt to succumb.

Prevention.—Yellow fever, like malaria, is a preventable disease, and will one day be only a matter of historic interest. Dr. W. C. Gorgas, U. S. A., during 1901, by ridding Havana of the mosquito carrying the yellow-fever organism through screening barrels and receptacles holding water, and by treating drains, cesspools, etc., with kerosene, succeeded in also eradicating yellow fever from that city, so that in the following year there was not one death from this disease; whereas, before this time, the average yearly mortality had been 751 deaths in Havana. Spread of the disease is controlled by preventing access of mosquitoes to the bodies of living or dead yellow-fever patients; while personal freedom from yellow fever may be secured by avoiding mosquito bites, through protection by screens indoors, and covering exposed parts of the face, hands, and ankles with oil of pennyroyal or spirit of camphor, while outdoors.

Treatment.—There is unfortunately no special cure known for yellow fever such as we possess in malaria. The patient should be well covered and sur-

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rounded with hot-water bags during chill. It is advisable to give a couple of compound cathartic pills or a tablespoonful of castor oil at the start. Two, or at most three, ten-grain doses of phenacetin at three hours intervals will relieve the pain during the early stage. Cracked ice given frequently by the mouth and the application of a mustard paper or paste (one part mustard, three parts flour, mixed with warm water and applied between two layers of thin cotton) over the stomach will serve to allay vomiting. Cold sponging (see Typhoid Fever, p. 232) is the best treatment for fever. The black vomit may be arrested by one-quarter teaspoonful doses of tincture of the chloride of iron, given in four tablespoonfuls of water, every hour after vomiting. The bowels should be moved daily by injection of warm soapsuds. The patient should not rise from his bed, but should use a bedpan or other receptacle. In addition, a pint of warm water, containing one-half teaspoonful of salt, should be injected into the bowel night and morning and, if possible, retained by the patient. The object of the latter is by its absorption to stimulate the action of the kidneys. The diet should consist of milk, diluted with an equal amount of water, broths, gruels, etc., and only soft food should be given for ten days after recovery. Iced champagne in tablespoonful doses at frequent intervals, or two teaspoonful doses of whisky in a little ice water, given every half hour, relieves vomiting and supports the strength.



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